

Jail Staffing Analysis Articles, 2005 - 2007



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Staffing Analysis- New Methods Provide More “Relief”

As published in *Sheriff Magazine*, November-December 2005. P.54

Rod Miller and Mark J. Wulff

Introduction

Jail staff costs constitute more than two-thirds of annual jail operating costs. Managing this valuable, critical and costly resource poses challenges for jail managers and policymakers. But there have been some advances in jail staffing analysis that are seeing the old “shift relief factor” methodology, on which jail managers have relied, now giving way to a new, flexible tool.

In 1987, the National Institute of Corrections (NIC) offered a new resource, the *NIC Staffing Analysis Workbook for Jails, First Edition*. Written for NIC by Rod Miller and Dennis R. Liebert, the *NIC Workbook* described a new, systematic approach to staffing analysis and presented new methodologies to the field, which a number of jails subsequently embraced. NIC updated it in 2001; the NIC Academy used the second edition in developing its first jail e-learning course, now available on line and on CD-ROM.¹

As jurisdictions apply the NIC process and methods, the refinements, improvements and innovations that they developed along the way are leading to some rather exciting developments in the field. This article describes the experience of Montgomery County, MD, as a team of jail staff and officials examined the linchpin of the staffing analysis process: the calculation of accurate “net annual work hours” (NAWH) for every custody-oriented classification of staff.

Staffing Analysis Process

The staffing analysis methodology described in NIC's *Workbook* involves 10 sequential steps:

The Staffing Analysis Process

- **Step 1. Profile the Jail-** describing the context in which staffing occurs
- **Step 2. Calculate Net Annual Work Hours-** understanding how many hours we really derive from each full time position, and getting the data and math right
- **Step 3. Develop a Facility Activity Schedule-** examining hour-to-hour levels of activity in the jail, and identifying opportunities for new efficiencies
- **Step 4. Develop the Staff Coverage Plan-** determining what type of staff are needed, where, and when, and with what exceptions
- **Step 5. Complete a Staff Summary-** a first look at the level of staffing
- **Step 6. Develop a Schedule-** finding efficient and effective ways to deploy staff to meet coverage needs

¹ <http://nicic.org/Services/eLearning.aspx>

- **Step 7. Evaluate, Revise, and Improve the Plan-** the equalizer-- identifying deficiencies in the plan before it is implemented
- **Step 8. Calculate Operational Costs-** asking for the right amount of resources
- **Step 9. Prepare a Report-** documenting your findings
- **Step 10. Implement the Plan and Monitor the Results-** continuously fine tuning the plan as it is implemented

Although the *Second Edition* expanded the seven-step process introduced in the *First Edition*, it also trimmed the content of the *Workbook* substantially and eliminated several forms and checklists, among them: Form 1A: Profile the Jail; Form 2A: Intermittent Activities/Operation Chart, now simplified as Form B, Facility Activity Schedule; Form 3A: Staff Assignment and Coverage, simplified and combined Form 3D, Staff Assignment Summary; Form 3B: Graph of Staff Assignment; Form 4A: Weekly Scheduling Summary; Form 4B: 2-Month Master Schedule; Form 5A: Master Evaluation Checklist; Form 5B: ACA Standards Checklist; Form 5C: Time/Task Analysis; and Form 7A: Monitoring Checklist.

Many practitioners still use some of these earlier forms and checklists, which are available from NIC through its Information Center (<http://www.nicic.org/pubs/pre/006510.pdf>).

Continually Improving the Process and Methodology

As more practitioners apply the staffing analysis process, they are developing important refinements and improvements.

For example, one county wanted to find a balance between the complex Intermittent Activities chart in the *First Edition*, and the somewhat simplistic Facility Activity Schedule in the *Second Edition*. They created an Excel spreadsheet that displayed the various intermittent activities that occur in the jail by half-hour increments. They assigned a value, or "weight," to each activity that reflected the extent to which jail operations were impacted. A higher value indicated a greater impact. Using a scale of 1 to 5, they might assign meal service a "4," shift change a "5," and a more localized activity such as an attorney visit a "1."

After the spreadsheet was completed, they totaled the values in each column (a column represented a half-hour block of time), similar to the *First Edition* chart. These totals were converted into a chart that graphically demonstrated the ups and downs of hourly and daily jail operations. This allowed them to focus on the high points, when staff was likely to be over-taxed, and the low points, when staff might not be fully occupied. By comparing activity levels in the jail to staffing levels, it is possible to quickly identify inconsistencies. That kind of analysis can be the impetus for any needed changes in procedures and scheduling in the jail, thereby improving efficiency in jail operations.

A sample of this enhanced activities form is available online, along with samples of a weighted form, at: www.correction.org Other forms and tools related to the staffing analysis process are also available at that site.

From "Relief Factor" to Net Annual Work Hours

In 1987, the NIC *Workbook* introduced a new staffing analysis term and concept, the "Net Annual Work Hour" (NAWH). Many practitioners have successfully applied the NAWH methodology to their own jail operations, finding it to be an important new staffing and budgeting tool. The NAWH method eliminates the need calculate various "relief factors."

A "relief factor" attempts to answer the question: "How many full-time staff must I have in my budget to provide continuous coverage for a relieved post?" Relief factors are usually calculated for posts that are operated 24 hours daily, every day of the year. But calculating a relief factor becomes very difficult, and less accurate, when a variety of posts are considered. Some posts operate for only part of the 24-hour day, and some posts are not operated every day of the week. Developing relief factors for the combinations of posts found in a creative and efficient modern jail is difficult and daunting. One county recently concluded it only required 4.1 full-time positions to staff 2 12-hour shifts, 365 days per year. They made math errors when they tried to adapt their old shift relief factor (for 8-hour shifts) to their new 12-hour shifts. This is a common error made as managers try to apply relief factor methodology to alternative shift patterns.

The NAWH method introduced in the NIC *Workbook* accomplishes the same goals, more accurately, and with much more flexibility. By focusing on the *hour* as the unit to be measured, rather than a shift, the process has been improved.

Although most steps in the staffing analysis process are more art than science, the NAWH calculations demand exacting attention to detail.

By calculating the "Net Annual Work Hours" (NAWH) for each classification of staff and at each facility, the budget requirements for any number of operational practices may be easily and accurately estimated. A NAWH calculation answers the question "How many hours is a typical officer (or other staff classification) available to be scheduled for duty handling mandatory post coverage in the jail annually?" The process for calculating NAWH is similar to the one that has traditionally been used for relief factors, but the product is much more useful and versatile.

Figure 1 shows how easy it is to use the NAWH method to identify budget requirements for a diverse set of posts and positions.

Figure 1 demonstrates many advantages of the Net Annual Work Hour methodology. First, it highlights the fact that different classifications of staff have a distinct NAWH-- the COI and Sergeants in Lines 1 and 2 are needed to cover the same number of total annual hours, but because the sergeants have more time off for vacations and training, they have a lower NAWH. Therefore, more FTE's are required in the budget to cover the same number of hours in a year.

Using a NAWH makes it easy to calculate the budget implications of an infinite number of post assignment patterns and schedules. The hours per day and days per week can be varied, but the NAWH is a common denominator to consistently determine budget needs. Imagine

trying to calculate separate "relief factors" for the situations posted in Figure 1. Not only would it be very difficult, it would likely be less accurate.

Figure 1: Samples of NAWH Use for Variety of Posts and Positions

Post or Relieved Position	A Number of Hours Post is Operated Each Day	B Number of Days Post is Operated Each Week	C Number of Hours/Year Needed to Operate Post (A times B times 52.14 weeks in a year)	D Net Annual Work Hours for Classif. of Staff Used to Operate the Post	E Number of Full-Time Equivalent Staff Needed in Budget to Provide Needed Coverage (C divided by D)	F Classification of Staff Assigned to Post
1. Control Center	24	7	8,670	1,580	5.44	COI
2. Shift Supervisor	24	7	8,670	1,522	5.70	Sgt
3. Front Lobby Rec. Desk	16	7	5,840	1,580	3.70	COI
4. Intake Power Shift	10	2	1,043	1,580	0.67	COI
5. Escort and Relief	12	7	4,380	1,580	2.77	COI
6. Exercise / Recreation Officer	10	4	2,086	1,556	1.34	COII

The NAWH estimate is a crucial budgeting tool that helps to distinguish between *gross* staff hours budgeted and the *net* hours that are actually available to be scheduled for daily DOCR operations.

SUMMARY

Calculating accurate Net Annual Work Hours pays off in many ways. Doing it right demands a lot of time and an exacting attention to detail, but the results are worth it and will be realized year after year. In the next issue of *Sheriff* magazine we will roll up our sleeves and provide detailed guidance, using a Maryland county as a case study.

Staffing analysis methods are evolving. There is room for improvement, enhancement, and new creative approaches. Practitioners are encouraged to report their experiences and their innovations so that they may be shared with their colleagues.

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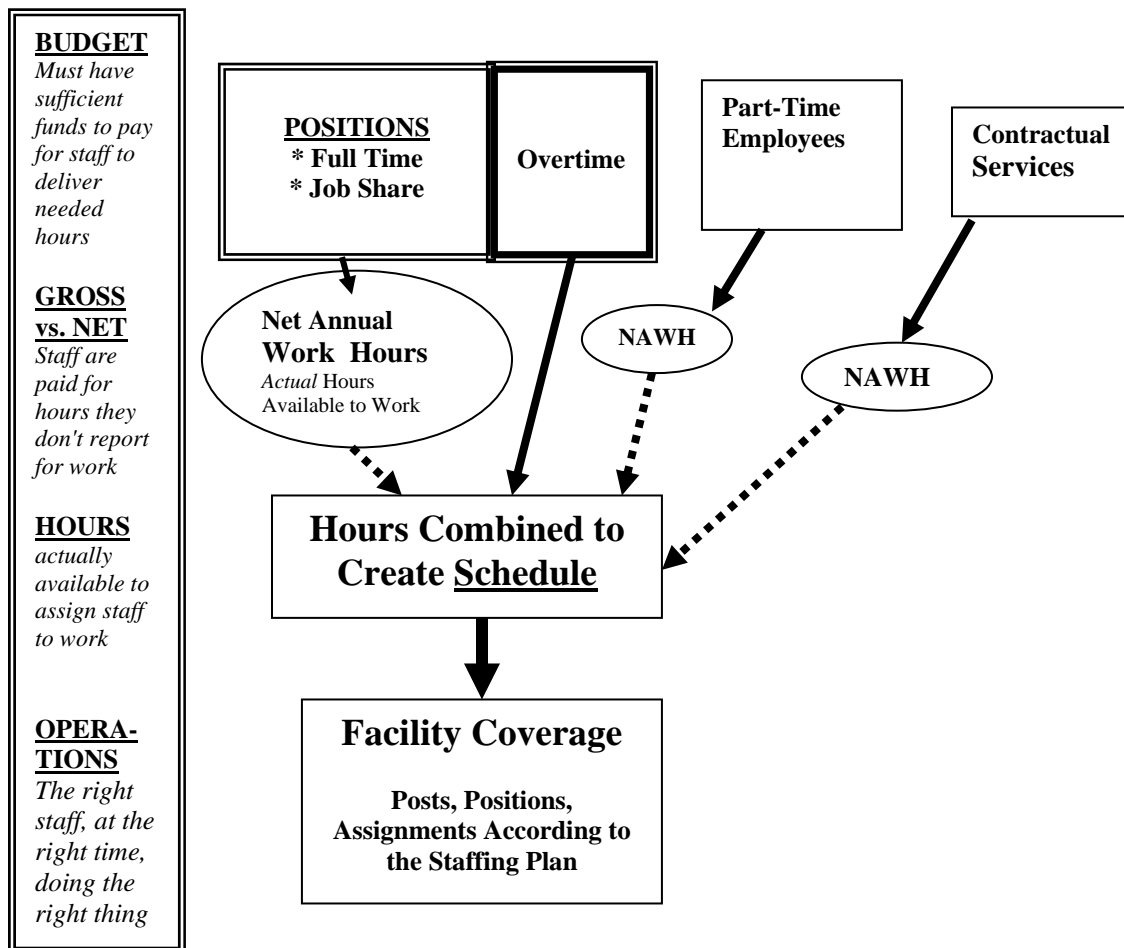
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From Budget to Actual Operations

(this figure was not included in the final version of the article due to space limitations)



Staffing Analysis-- New Method *Accurately* Converts Posts to Budgets

As published in *Sheriff Magazine*, January-February 2006. P. 34

Rod Miller and Mark J. Wulff

Introduction

In our first article in this series¹ we underscored the importance of adequate and efficient staffing and introduced the methodology that has been developed by the National Institute of Corrections (NIC).² One of the innovations introduced by NIC is the “Net Annual Work Hours” (NAWH) methodology that replaced the old shift relief factor calculations. This new tool has proven to be more accurate in converting staffing practices to budget requirements.

Staffing Analysis Process

The methodology described in NIC's *Workbook* involves 10 sequential steps:

The NIC Staffing Analysis Process

- **Step 1:** Profile the Jail
- **Step 2:** Calculate Net Annual Work Hours
- **Step 3:** Develop a Facility Activity Schedule
- **Step 4:** Develop the Staff Coverage Plan
- **Step 5:** Complete a Staff Summary
- **Step 6:** Develop a Schedule
- **Step 7:** Evaluate, Revise, and Improve the Plan
- **Step 8:** Calculate Operational Costs
- **Step 9:** Prepare a Report
- **Step 10:** Implement the Plan and Monitor the Results

This article focuses on the experience of Montgomery County, Md, as it implemented Step 2, Net Annual Work Hours, for the first time.

A Participatory Process

Several Montgomery County Department of Correction and Rehabilitation (MCDOCR) staff and officials were involved with the initial NAWH calculations, including the chief of administration, the human resources manager, the chief of security for the new correctional facility, the chief of security for the detention facility, and the pre-release center supervisor.

¹ *Staffing Analysis- New Methods Provide More “Relief;” Sheriff Magazine*, National Sheriffs’ Association, vol. 57, no. 61, November-December 2005.

² Miller, Rod and Dennis R. Liebert, *NIC Staffing Analysis Workbook for Jails, First Edition*. National Institute of Corrections, Washington, D.C. 1987. *Second Edition* published in 2001. For copies go to www.nicic.org. E-learning course, available on-line or as a freestanding computer-based learning program on CD-ROM (<http://nicic.org/Services/eLearning.aspx>)

Involving more staff in the process proved effective. Their participation paid off in identifying each element that applies to the process, collecting and analyzing data, and projecting future developments. It was also helpful when it was time to explain the findings, and the resulting budget requests, to officials.

Before trying the NAWH methodology, MCDOCR had calculated a "relief factor" for staff assigned to relieved posts. The NIC methodology offered a new and promising methodology, the Net Annual Work Hour (NAWH), and Montgomery County decided to try it in evaluating staffing levels for its FY 2006 budget request. The County opened a state-of-the-art correctional facility in 2004 and continued to operate its older detention center. With 282 correctional officers in FY 2006, it was essential to calculate budget needs accurately.

Ten Percent Short

As it turned out, the differences between the old methodology used by the MCDOCR (relief factor) and the new NAWH calculations were significant. The relief factor used for the FY2005 budget analysis turned out to be nearly 10 percent *lower* than that calculated by the NAWH methodology for the initial budget submission. If the MCDOCR had used the old methodology again, it would have continued to struggle with an ongoing overtime problem that was certainly driven in a large part by the budget shortfall caused by the earlier shift relief calculations. Using the old relief factor technique, the County entered the fiscal year nearly 30 full-time-equivalent officers short-- simply because of the math. The new NAWH method demonstrated the real number of hours a typical staff member was available to be assigned to a post each year.

Using the NAWH methodology, Montgomery County found that for every three hours a typical correctional officer works, he/she receives an hour of paid time away from his or her primary post. This is not unusual for a jail in the United States, though the precise combination of reasons that take jail staff away from their posts with pay (vacation, sick time, training, military leave, etc.) is unique to each facility.

Why must the NAWH estimate be accurate? Because failing to accurately estimate NAWH inevitably results in budget shortfalls, usually in the form of unexpected overtime. Even worse, budget shortfalls might cause an agency to leave posts vacant, posing serious safety and liability concerns.

DOCR officials made the case that the NAWH estimate is a crucial budgeting tool that helps to distinguish between *gross* staff hours budgeted and the *net* hours that are actually available to be scheduled for daily MCDOCR operations. As a result, subsequent budgets were adjusted to add nearly 10 percent more staff-- not to increase deployment in the jail, but to provide sufficient funds (for the first time) to cover the staffing practices that had already been in place. The county's policy requires all posts and positions in the MCDOCR daily staffing plan to be filled, and that caused expenditures to chronically exceed budget allocations, usually in the form of unexpected levels of overtime.

When budget estimates are inaccurate (in other words, too low), the county has to draw on staff overtime because it has no part-time staff resources, which means that all short falls must be satisfied by overtime. Extensive use of overtime is not only expensive, it is also bad for the organization in other ways.

Excessive overtime leads to:

- Performance problems for staff who work long hours
- Increased use of sick leave when employees try to manage their personal lives
- Added overtime that is needed to compensate for growth in sick leave
- Disciplinary actions that take up the time of the employee, the supervisor, and management

Excess mandatory overtime also undermines the department's reputation within the ranks and generates widespread morale problems.

Using the Worksheet to Calculate NAWH

Form A in the *Second Edition Workbook* provides a template for calculating NAWH.³ Montgomery County used this as a starting point. Figure 1 describes each of the factors that Montgomery County found that would cause a staff member to be away from his or her post with pay, including various forms of paid leave (vacation, sick, holidays) and other activities that make them unavailable to report to their posts (such as certain types of training). (See Figure 1)

There are two basic methods for estimating a figure for each element of the NAWH calculation:

Actual experience from previous years, preferably using several years of data to identify trends and patterns. Example: average amount of vacation time actually used per year was calculated by adding all vacation time taken by full time staff in a classification, and dividing the total hours by the number of staff. In accounting terms, this would be a "cash" basis of analyzing data. Hours are counted only when they are actually used, not when they are earned.

Accrued (entitlement) in the coming year. This approach identifies the amount of time off that is specified in employee contracts and personnel policies. In accounting terms, this would be an "accrual" method-- hours are counted when they are earned, regardless of when they are actually used.

Two techniques are used to refine the estimates:

Projecting the impact of new practices for which no data are available. This technique looks ahead to the next year and predicts changes in the context. This is often necessary when there are changes in laws or policies. For example, it was necessary to project the impact of the Family Medical Leave Act for the year after it was enacted. Changes must also be projected when a new employee contract becomes effective.

Adjusting figures based on expected or desired changes in the coming year. This technique examines past practices and entitlements and makes deliberate adjustments for the coming year. For example, if an employee contract is being negotiated in the coming year, an adjustment might be made to predict an expected change in entitlements. If the

³ The form, and the complete staffing analysis workbook, are available on-line at the National Institute of Corrections web site, www.nicic.org. The form is also available as an Excel spreadsheet at the NIC site.

county launches an initiative to reduce staff use of sick leave, for example, the NAWH would be adjusted to reflect the impact of this desired change.

Figure 1: Categories of "Time Off" Used by Montgomery County

Time Off Category Used in NAWH Calculations for FY 2005	Source and Methodology
Vacation Hours	Actual hours used based on past experience
Average Compensatory Hours	Actual hours used based on past experience
Average Sick Leave Hrs (projected, recent experience)	Actual hours used based on past experience
Projected Training Hours (see notes) <i>training received</i>	Projected, based on anticipated turnover and changes in training practices
Average Trainer Hours (staff <i>serving as trainers</i>)	Actual hours used based on past experience
Personal Leave Hours (CLE, PER)	Actual hours used based on past experience
Average Military Hours (Active)	Actual hours used based on past experience
Average Medical Exam Hours	Projected based on contractual requirements
Admin 2 (AD2) Union Business	Actual hours used based on past experience
Admin 5 (AD5) Uncontested Temp. Disability	Actual hours used based on past experience
Average Disability Hours (DAL)	Actual hours used based on past experience
Administrative (AML) incl. Court, bereavement, military (reserve)	Actual hours used based on past experience
Leave W/Out Pay (LWOP)	Actual hours used based on past experience
Holidays	Based on contractual requirements
CONSIDERED BUT NOT USED by Montgomery County	
Breaks	Not used for NAWH calculation because this activity is addressed in the staffing and coverage plan
Time to Fill Vacancies (Vacancy Rate)	Not used because this is addressed in the annual budget in a different way

One technique frequently used in this process is the "weighted average." An example of a weighted average may be found in the analysis of training hours. The amount of training provided to newly-hired MCDOCR correctional officers is substantially higher than training provided to staff after their first year of employment.

Figure 2: Net Annual Work Hours (NAWH) Work Sheet for FY 2005

Projected Net Annual Work Hours, FY 2005		A--MCDC	B--MCCF
		CO I-III & MCO Detention Center	CO I-III & MCO Correctional Facility
1	TOTAL HOURS contracted annually	2086	2086
	HOURS OFF		
2	Average Vacation Hours	112	150
3	Average Compensatory Hours	26	32
4	Average Sick Leave Hrs (projected, recent experience)	92	92
5A	Projected Training Hours (see notes) training received	53	52
5B	Average Trainer Hours (staff serving as trainers)	5	5
6	Personal Leave Hours (CLE, PER)	30	30
7	Average Military Hours (Active)	27	36
8	Average Medical Exam Hours	3	3
9	Admin 2 (AD2) Union Business	0	2
10A	Admin 5 (AD5) Uncontested Temp. Disability	4	10
10B	Average Disability Hours (DAL)	40	40
11	Administrative (AML) incl. Court, bereavement, military (reserve)	18	22
12	Leave W/Out Pay (LWOP)	6	6
13	Holidays	80	80
14	TOTAL HOURS OFF-POST per employee per year	496	560
15	NET ANNUAL WORK HOURS (Line 1 minus Line 14)	1590	1526
16	NAWH expressed as a "relief factor" (for reference)	5.51	5.74

A weighted average for training identifies the amount of training for first-year officers and multiplies it by the number of staff expected to be in their first year in FY 2006. This figure would be combined with the total hours for officers who have been employed for more than one year, and the grand total is divided by the total number of staff.

This is depicted in the formula below.

$$\text{Average Training Hours} = [(O_1 \text{ times } T_1) + (O_2 \text{ times } T_2)] \div (O_1 + O_2)$$

Where--

O₁ = Number of Officers expected to be in their first year of employment

T₁ = Number of hours of training for each new officer

O₂ = Number of Officers expected in their second or higher year of employment

T₂ = Number of hours of training for each officer in their second or higher year

Montgomery County's findings for correctional officers in each facility are shown in Figure 2. Other classifications of staff were also examined by the MCDOCR but are not shown on this sample. (See Figure 2)

SUMMARY

Montgomery County used the new staffing analysis methodology to produce a more accurate budget request. In the process they explained chronic staffing shortfalls that had troubled the county for years. Based on their experience with the new Net Annual Work Hours methodology, the county is now applying other new staffing analysis techniques to its operations.

In our next installment, we will examine another step in the staffing analysis process in more detail.

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Mark J. Wulff has been Chief of Administration, Montgomery County, Md., Department of Correction and Rehabilitation since 1997. He previously served as a programmer, analyst, manager, and administrator with the county for more than 30 years. He may be reached at (240) 777-9980 or by e-mailing at: Mark.Wulff@montgomerycountymd.gov

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Increasing Efficiency of Jail Staff

As published in *Sheriff Magazine*, March-April 2006. P. 48

By Rod Miller, founder of CRS, a nonprofit organization created in 1972 to provide research, planning and publications for detention and corrections; and John Wetzel, warden of Franklin County Jail in Chambersburg, PA

This is the third of a series on staffing of jails. The first article appeared in the November-December 2005 issue, the second in the January-February 2006 issue. The articles reflect the 10 steps developed by the National Institute of Corrections.

Sheriffs must manage their jail activity schedule, not let it manage them. By rigorously analyzing jail operations, sheriffs can solve staffing problems, more than likely without increasing the budget.

“Develop a Facility Activity Schedule,” the third of a 10-step program on staffing of jails as explained in a workbook by the National Institute of Corrections¹, identifies all the programs, activities, support services, and security functions that take place in the jail and then charts the times they occur over the course of a typical week. This step does not record continuous activities, such as supervising inmates or booking and releasing inmates, which are covered in Step 4.

In the first edition of the NIC workbook, the process of identifying activities was done manually. The blocks of time corresponding to each intermittent activity were shaded and shaded blocks were counted and recorded at the bottom of each column.

The types of intermittent activities that should be recorded include:

- Shift change
- Formal counts or lockdowns
- Meal service.
- Visiting (public or attorney)
- Sick call.
- Clinic times.
- Administering medications
- Court appearances
- Commissary
- Outdoor exercise
- Education classes
- Counseling sessions
- Library hours
- Religious services
- Laundry exchange

¹ **Staffing Analysis Workbook for Jails**, First Edition. Rod Miller and Dennis Liebert. National Institute of Corrections, Washington D.C. 1987. Second Edition published in 2003.

- Inmate transports
- Inmate work activities

The older version of the activity chart has been replaced with a spreadsheet in the *Second Edition* of the workbook. The process has improved since the Institute's workbook was first published, most recently to acknowledge that some activities carry more weight than others.

After your activities have been recorded, devise a chart that arrays them across a typical 24-hour day. This is easily done with the "total" row at the bottom of the worksheet. Figure 1 provides a graph of the activity levels with the times of shift changes.

Figure 1: Sample Graph of Activity Levels

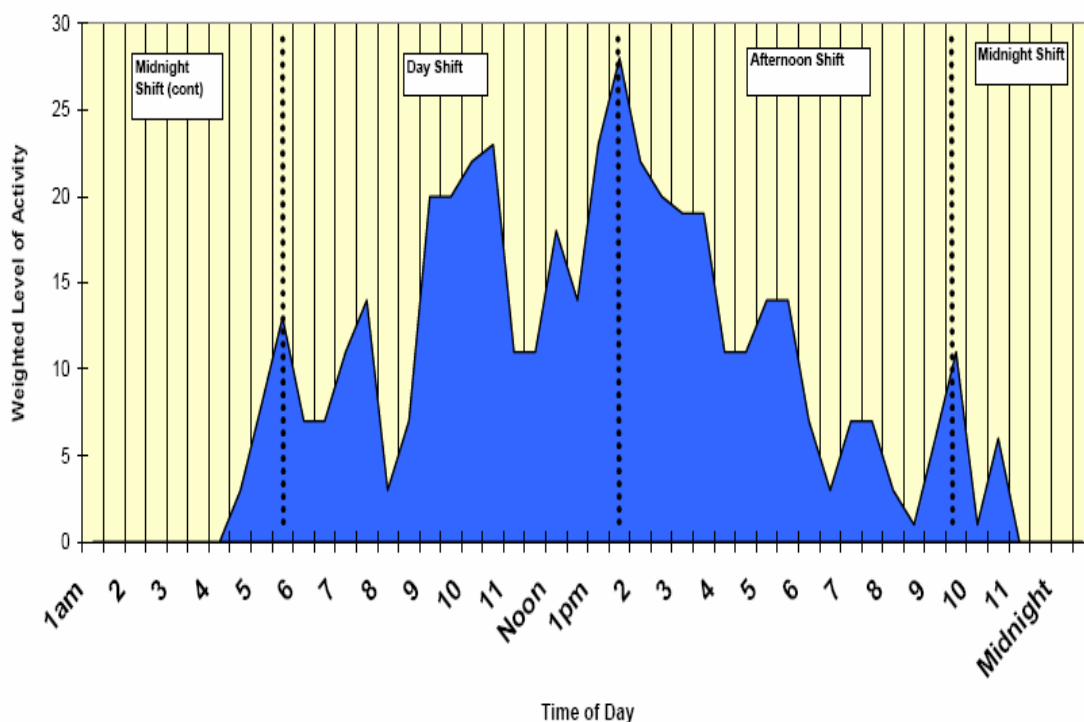
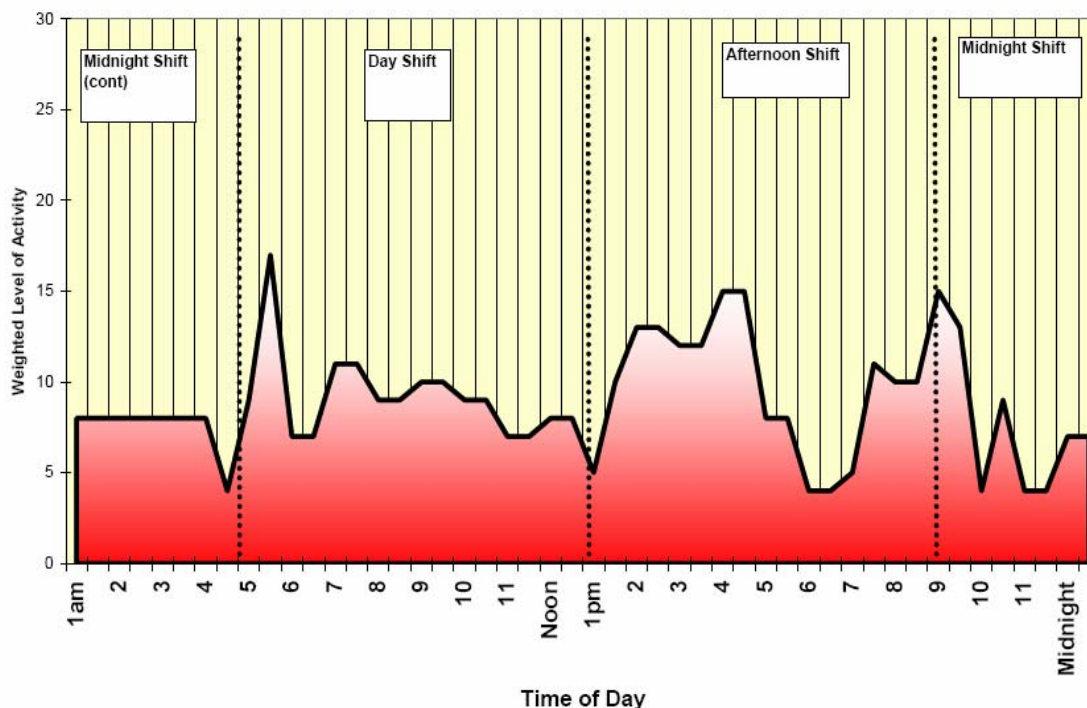


Figure 1 is fairly typical of levels of jail activity. In the sample that was used for Figure 1, staff worked 8-hour shifts that changed at 5:30 a.m., 1:30 p.m. and 9:30 pm. As you look at Figure 1 with that in mind, it becomes clear that shift schedules "straddle" higher periods of activity. Even at the end of the midnight shift, there is a major upswing in activity after six hours of relative inactivity.

How do you assign staff to respond to such varying needs? Ask yourself, "How can we adjust our daily activities to improve the fairness and efficiency of our staffing?" Using the activities described in Figure 1, we adjusted the schedule of several activities without increasing or eliminating activities. The changes in the graph are shown in Figure 2.

Figure 2: “After” Activity Graph

The blue mountains and valleys depict the activity levels before the adjustments. In revising the activity schedule, we sought to:

- Reduce the scale of the peak activities.
- Moderate the level of activity on the day shift.
- Move some activities to the evening shift.
- Increase activities in the midnight shift—when staff usually is underutilized but is needed to ensure response to emergencies.
- Make the work loads for each shift more fair and equitable.

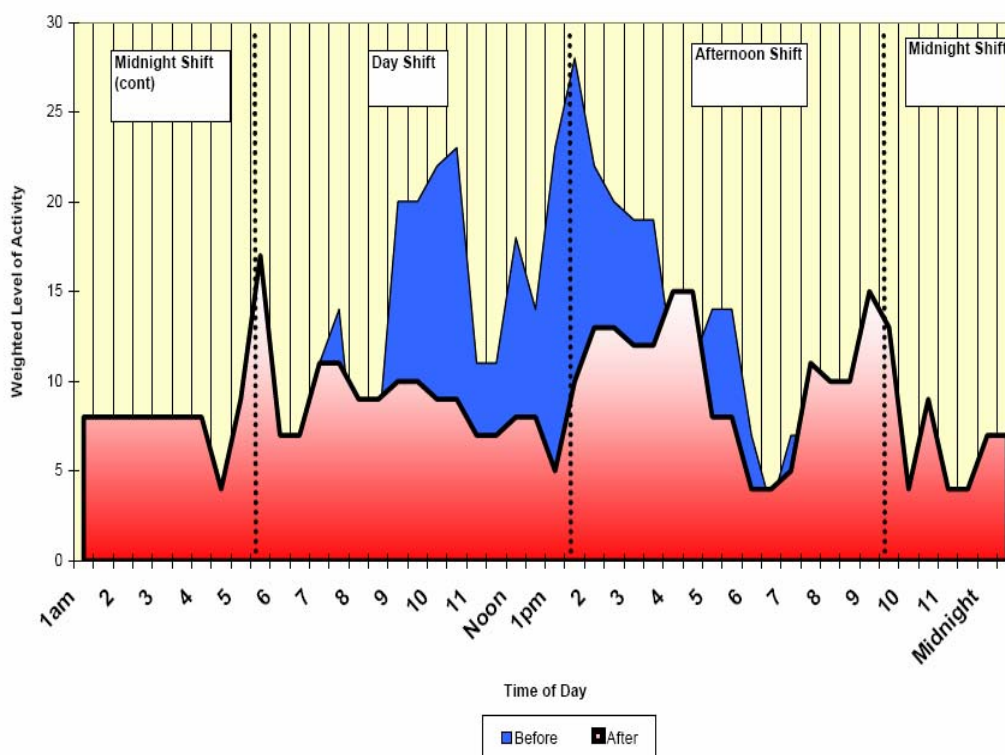
To accomplish these, we adjusted the activity schedule by:

- Moving all of the morning court-line activities to the day shift while still allowing plenty of time for the inmates to be in court on schedule.
- Moving lunch 30 minutes forward to eliminate the conflict with video court.
- Moving the evening meal 30 minutes forward to maintain the appropriate time between meals.
- Denying attorneys access to their clients during meals.
- Moving morning visiting hours to the evening.
- Moving the morning education classes, Narcotics Anonymous and Alcoholics Anonymous programs to the evening, which is more consistent with the schedule inmates will encounter in the community and which increases the number of volunteers available in the evening hours.

- Moving mail sorting activities to the midnight shift
- Moving commissary order fulfillment to the midnight shift.
- Moving commissary distribution earlier in the day shift.
- Moving cleaning, records maintenance, court-line scheduling, and rosters to the midnight shift when the level of the skeleton crew is determined by the need to respond to emergencies, but when there are often not enough activities to keep this level of staffing busy.
- Adjusting the exercise schedule to reduce conflicts with meals.

Figure 3 compares the “before” and “after” daily schedules.

Figure 3: “Before” and “After” Daily Schedules



Other adjustments might have been tried, such as concentrating activities on one shift (day and/or evening) that normally have higher staffing levels.

Of course, shifts are only a starting point for your coverage and scheduling activities. Staggering the starting and ending times of posts and positions might prove more efficient for some activities.

Longer shifts often prove efficient and effective. An exercise officer on a 10-hour shift might be able to accomplish all of the tasks associated with that activity.

A supervisor on a 9-hour or 10-hour shift will be able to overlap with the outgoing and incoming shift in a cost-efficient manner. The possibilities are endless.

The staffing analysis process will identify many ways that you can improve your current practices and “work smarter.” Step 3 encourages you to take control of your daily jail activities to make staff work loads more fair, equitable and efficient.

Rod Miller, founder of CRS Inc., is the author and co-author of numerous articles on jail planning, design, and operations. For more information, contact him at rod@correction.org, 925 Johnson Drive, Gettysburg, PA 17325, and (717) 338-9100.

John Wetzel, warden of Franklin County Jail in Chambersburg, PA. Contact him at jewetzel@co.franklin.pa.us, 625 Franklin Farm Lane, Chambersburg, PA 17201, and (717) 264-9513.



Dane County Sheriff Gray Hamblin marks staff posts on the board during a three-day staffing analysis training program sponsored by the National Institute of Corrections.

Profiling Helps Improve Staffing

As published in *Sheriff Magazine*, May-June 2006. P. 8

By Rod Miller, founder of CRS, a nonprofit organization created in 1972 to provide research, planning and publications for detention and corrections; and John Wetzel, warden of Franklin County Jail in Chambersburg, PA

This is the fourth of an indefinite series on staffing of jails. The first three articles appeared November 2005, and January and March 2006. The articles reflect the ten steps developed by the National Institute of Corrections.

Face it. Most of us pay attention to staffing when it becomes a problem. The methodology¹ developed by the National Institute of Corrections has proven successful, whether applied proactively or as a problem-solving technique.

Identifying and Involving Stakeholders

Developing and implementing lasting improvements in staffing practices requires the efforts and support of all who have a stake in jail operations, primarily the following:

- Sheriff, correctional director, or other official responsible for the jail.
- Jail administrator.
- Other jail command staff.
- Jail first-line supervisors.
- Line officers.
- Program staff.
- Contract service providers, such as health service or food service.
- Policymakers, such as commissioners, council members, and city managers.
- Budget analysts
- Personnel/human resource managers.
- Labor union representatives
- Jail inspection officials.

You might consider broadening this list to include those with an interest in the inmates and their success after release from jail. Re-entry efforts are gaining support.

Participants in a recent training sponsored by the National Institute of Corrections identified the following as stakeholders in jail operations:

- Jail civilian staff
- Jail service providers
- Community service providers

¹ **Staffing Analysis Workbook for Jails**, First Edition. Rod Miller and Dennis Liebert. National Institute of Corrections, Washington D.C. 1987. Second Edition published in 2003.

- Workforce/employment agencies
- Business community
- Inmate advocates and families
- Religious community
- Educators and training providers

At first you might wonder why some of these stakeholders are on the list. Religious entities, for example, are affected by staffing practices when they encounter difficulty visiting inmates, or conducting services at the jail. Also, faith-based initiatives in many communities work with inmates before and after their release. Advocates and families are acutely concerned with the overall safety of the jail. Connections between stakeholders and the jail must be identified and respected.

Many sheriffs and jail managers have found that it is not question of “if” stakeholders will weigh in on jail operations, but rather “when” and “how” they will weigh in. Involving stakeholders in the staffing analysis process provides an opportunity to:

- Educate them on the complexities of the jail
- Listen to their concerns and ideas
- Seek their support for acquiring needed resources

One jail manager grumbled about involving the union with the staffing analysis process, but admitted it was better to “give them their pound of flesh an ounce at a time” during the process, rather than creating a standoff at the end. A union official had a more upbeat reaction, voicing appreciation for the opportunity to be involved with the creative process rather than being confronted with a “take it or leave it” decision at the end.

Stakeholders should be given meaningful opportunities to shape the staffing plan. Participation may be secured by forming a team to conduct the staffing analysis, and by assigning the principal staffing analysis duties to a single person who circulates findings to a larger group for review and comment, or through other approaches. Whatever methods are used, you will not be successful unless the stakeholders have *meaningful* opportunities to participate and have their ideas seriously considered.

Profiling the Jail

Jail managers must adjust to change daily, often involving things over which they have little or no control, such as crime, arrests, bail and release, and sentencing. Creating a profile of the jail, one of the initial steps in the staffing analysis methodology of the National Institute of Corrections, helps cope with change.

It is tempting to skip this step-- after all, *we* already know about the jail context because we work with it every day. But remember that most stakeholders do not have the same understanding of the jail setting and its operation.

It is up to you to paint an accurate picture.

Only with an understanding of the jail context, will stakeholders be able to participate fully in the staffing analysis process and in the recommendations that follow.

Further, because jail operators experience the change in daily increments, we are less likely to appreciate the overall impact on the jail.

Jail managers and officials are often too close to daily operations to appreciate the magnitude of changes over time. We adjust our operations in smaller increments. Jail managers are invariably surprised when they step back and look back at the magnitude of change.

In a recent training workshop, one jail administrator suggested that he was “not seeing the forest for the trees.”

Fresh eyes, even those belonging to folks who know little to nothing about corrections, often offer clear perspective and promote creative change.

This article explores the Step One, which provides an essential foundation for the creative approaches that are implemented in the subsequent steps.

The first step in profiling the jail is to collect jail inmate population data, operational philosophy information (mission statement), floor plans of the facility, operational budgets, state and professional standards, and relevant case law. These need to be available during later steps in the process and need to be analyzed to describe the physical, operational, and human context of the jail at the time of the staffing analysis.

A detailed profile of the jail setting is essential in a comprehensive staffing analysis. The profile may be needed to justify requests to funding sources, or even in court. Also, subsequent staffing analyses should review and update the previous profile.

The profile should examine and record key features and characteristics of the jail setting, including:

- Facility rated capacity.
- Average daily population for the past several years broken into various groupings.
- Number of admissions and releases, time and day of week for admissions and releases.
- Length of stay-- not just average, but analyzed in more detail.
- Inmate characteristics such as age, race, sex, residence, charge, and judicial status.
- Number and types of classifications and housing separations.
- Mission statement.
- Facility design (floor plan).
- Location and condition of equipment such as closed-circuit television, and electronic detection systems.
- Organizational chart, span of control, management philosophy.

- Staffing plan, schedule, shift rosters.
- Number and type of critical incidents.
- Personnel agreements, union contracts.
- State and professional standards.
- Applicable court decisions.
- Latest inspection reports.
- Service contracts in effect.
- Recent problems experienced with facility operations.
- Issues to be addressed by a staffing analysis.

Collecting, analyzing, and logically arranging this information will lay the foundation for the staffing analysis. Consider asking middle management and line-staff to help present the information to the stakeholders. Their perspective and buy-in is priceless; and they may surprise you.

Be sure to document all information you have gathered. Keep this material for future reference and as a snapshot of the situation at the time of this staffing analysis. It may also prove useful for other activities, such as managing jail crowding.

Inmate Data

Many jurisdictions have used this step in the staffing analysis process to expand their analysis of inmate data. “Length of stay” is a good example of data that is often poorly analyzed.

Jail managers know that average length of stay is anything but average. When we attempt to describe our inmate population in broad terms, like average length of stay, we mislead the stakeholders and the public who need to have a clear understanding of jail dynamics.

Figure 1 describes a typical jail population in terms of length of stay, but it also compares the inmate admissions to the number of detention days accrued.

For example, nearly 65 percent of the inmates admitted to the jail spent one day or less in confinement, but these inmates accounted for only 1.2% of the detention days.

The numbers under “admissions” address the volume of inmates who are admitted, not the impact they have on jail beds.

But the numbers under “detention days” provide a view of the jail that is more like a “snapshot” of a typical day.

The *average* length of stay for the inmates described in Figure 1 is 11.6 days. Using this average without the detention day analysis, you might expect to walk into the jail on a typical day and find that the majority of inmates will be spending about eleven days in confinement. But Figure 1 demonstrates how misleading the average can be.

In fact, if you take a snapshot of this jail on a typical day, 94 percent of the inmates will spend 11 *or more days* in confinement and 87 percent of the inmates will spend more than 30 days.

Figure 1: Length of Stay Data for Typical Jail

Number of Days in Confinement	Cumulative Percent of Admissions	Cumulative Percent of Detention Days
Less than 1 day	47%	Less than 1%
1 day	64%	1%
2 days	73%	2%
3 days	76%	3%
4 days	77%	3%
5 days	79%	3%
6 - 10 days	82%	6%
11-30 days	88%	13%
31-60	92%	26%
61-90	94%	39%
91-120	96%	52%
121-150	97%	62%
151-180	98%	70%
181-365	99%	95%
366-548	100%	99%
549+	100%	100%

Figure 2 presents the data from Figure 1 in two graphs that compare and contrast length of stay in terms of admissions and beds used (detention days).

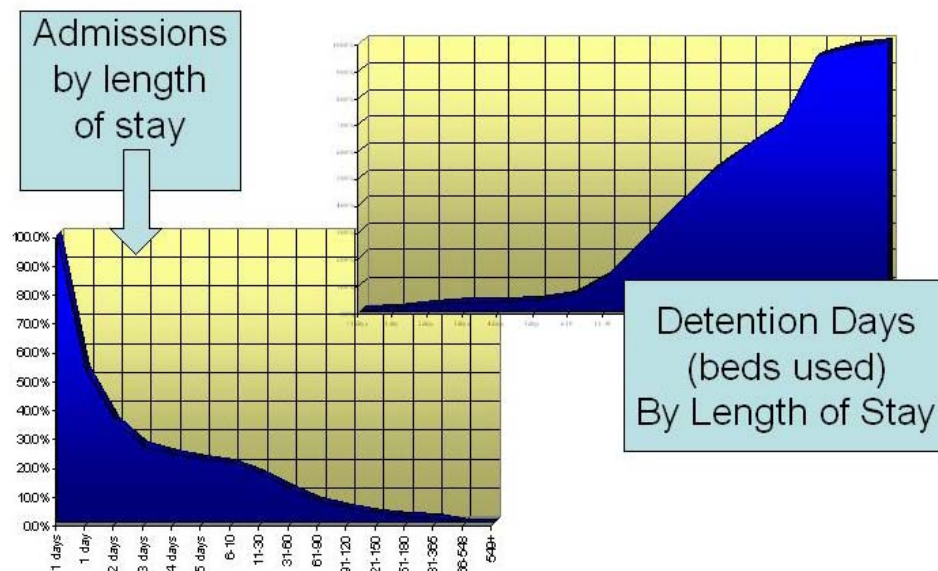
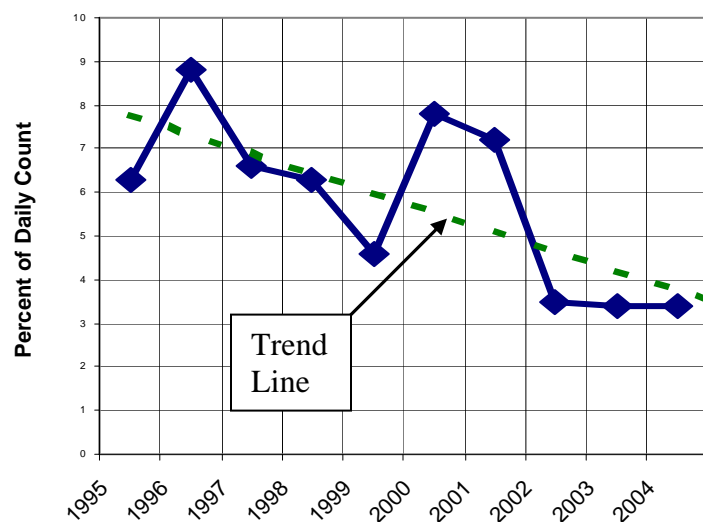
Figure 2: Comparison Charts Based on Length of Stay

Figure 3 provides another example of the value of examining data during this early stage of the staffing analysis process.

In the process of assembling data for the staffing analysis, one county noted that the proportion of sentenced county inmates was dropping significantly in recent years, as shown by the trend line on the chart.

Figure 3: Percent of Daily Population Convicted of “County” Offenses

The insights in Figure 3 have many implications for jail operations. First, county-sentenced inmates are considered the lowest-risk offenders, having been convicted of relatively minor offenses.

These inmates requires less supervision. They also comprise the majority of the inmate workforce. County officials used this insight as an example of the steady hardening of the inmate population in recent years.

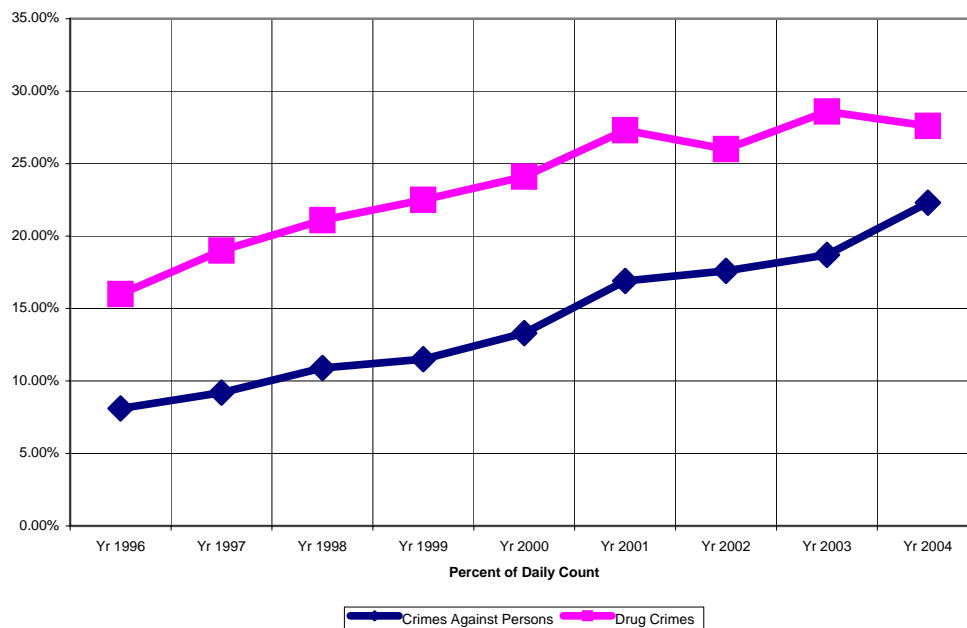
As the jail became more crowded, these low-risk inmates were an easy target for alternatives to confinement that would reduce crowding, such as day reporting, probation, and other community based sanctions.

Another staffing implication from this data is that the supply of inmate-workers is dwindling, possibly leaving tasks undone.

Nearly 20 percent of all jail inmates spend six or more hours each day working in our jails.² In order to maintain the inmate workforce, the jail will have to use less-desirable inmates, including pretrial detainees, who will require more supervision as they work.

Figure 4 provides another view of the trends in the sample jail's population.

Figure 4: Type of Charge



Significant staffing implications may be derived from this data, including growing concerns about a more violent inmate population, changing contraband concerns and increased demand for medical services.

² *Work in America's Jails*. National Institute of Justice, 1996. Washington D.C. www.jailwork.com

Summary

The combination of getting the right people involved in some manner and gathering accurate and meaningful information to inform them, will pay dividends as you improve staffing practices.

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Think Outside the Schedule: Determine Coverage Needs

By Rod Miller, founder of CRS, a nonprofit organization created in 1972 to provide research, planning and publications for detention and corrections, and John Wetzel, warden of Franklin County Jail in Chambersburg, PA

This is the fifth of a series on staffing of jails. The articles explore the jail staffing analysis methodology developed by the National Institute of Corrections and enhancements that have been developed since NIC's latest workbook was published. The first four articles addressed the calculation of "Net Annual Work Hours," the development of a "Facility Activity Schedule," and "Using Participation and Profiling to Improve Jail Staffing." This article examines the process of determining staff coverage needs.

In many jails, the tail is wagging the dog. Staff *schedules* have evolved and have been given priority to the point that the underlying staffing *needs* are sometimes not being met. More often, schedules provide significantly more staff than are actually needed a various times, placing a strain on budgets and staff. In a perfect world (which of course none of us live in), *needs* are identified and then *staff schedules* are devised to respond efficiently to the needs. Absent that perfect world, we challenge you to look at your needs, separate from your current staff schedule.

This series of articles builds on the groundbreaking staffing analysis methodology created by the National Institute of Corrections (NIC) and describes many enhancements developed since the NIC *Workbook*¹ was last revised.

The methodology developed by NIC promotes a proactive and creative approach that has proven successful in counties of all sizes. In previous articles we have addressed the first three steps that comprise the 10-step methodology created by NIC:

- *Step 1. Profile the Jail*
- *Step 2. Calculate Net Annual Work Hours (first and second articles)*
- *Step 3. Develop a Facility Activity Schedule (third article)*
- *Step 4. Develop the Staff Coverage Plan*
- *Step 5. Complete a Staff Summary*
- *Step 6. Develop a Schedule*
- *Step 7. Evaluate, Revise, and Improve the Plan*
- *Step 8. Calculate Operational Costs*
- *Step 9. Prepare a Report*
- *Step 10. Implement the Plan and Monitor the Results*

¹ **Staffing Analysis Workbook for Jails**, First Edition. Rod Miller and Dennis Liebert. National Institute of Corrections, Washington D.C. 1987. Second Edition published in 2003.

The fourth step in the staffing analysis process focuses on the actual needs for staff at each hour of the day. Throughout this step you must attempt to ignore current staff schedules and examine:

- what type of staff members are needed
- when (exact hours of need and days of the week)
- where (location in the facility)

A reminder about this process. Although it is comprised of a series of steps, you will often find it advisable to take a step or two backward to fix a problem that you discover in a subsequent step. In this coverage step, you will likely identify additional improvements and efficiencies in your daily operations. A “spike” in the coverage chart might suggest another refinement in your daily activities plan (Step 3). Similarly, coverage irregularities may prompt you to go back and reconsider some of your underlying policies, procedures and practices that were identified in Step 1. Remember that you control many aspects of the jail’s daily operations, and you should exercise this authority to “work smarter.”

Form C from the *Workbook* provides a useful tool for developing a coverage plan. The version of Form C that was presented in the Second Edition has been significantly improved as it has been applied in various facilities. Several enhancements were created by a group of jail administrators who participated in an NIC-sponsored staffing analysis training event in Phoenix.

To accomplish this step, you will use the materials and insights that you assembled in Step 1 (profile of the facility including facility layouts, mission and such), Step 2 (Net Annual Work Hours) and Step 3 (facility activities).

Have a copy of the facility floor plan in front of you when you start to draft Form C. In the first column (A) of the form you will record an identifying code, and then you will mark the location of the corresponding activity on the floor plan. Describe the activity (or post) in Column B.

Create a new line for each new activity and for each block of time associated with an activity. Note that in the sample in Figure 1, there are three lines for “staff breaks and relief” because there are three different blocks of time associated with this activity.

Column C identifies the classification of staff who will be assigned to each activity, such as Correctional Officer 1 (CO1) or sergeant. Describe the actual hours for which coverage is needed in Column D, and be sure to record only the needs-- not what might be currently scheduled. Column E reports the number of hours per day for each activity, and the number of days per week is shown in Column F. If you are using the Excel forms that are available, Columns G (total hours per week) and H (total hours per year) will be automatically calculated.

Figure 1: Sample of Coverage Form

Sample of FORM C: Coverage Needs								
A	B	C	D	E	F	G	H	I
CODE	Enter each post or		Hours of	Hours	No. of	No. of	No. of	Is this
(for	position, by function,	Job	Coverage	per	Days	Hours	of Coverage	post/posit.
each	in a line below	Class	(e.g. 0730 to 1130)	Day	per	per	per Year	relieved?
post or	(describe each)				Week	Week		
position)					(1 to 7)	(E x F)	(G x 52.14)	(Y / N)
1	Master Control	CO2	0000 to 2400	24	7	168	8760	Y
2	Housing Sub Control A	CO1	0530 to 2300	17.5	7	122.5	6387	Y
3	Housing Sub Control B	CO1	0530 to 2300	17.5	7	122.5	6387	Y
4	Intake and Booking Supr	Sgt	0000 to 2400	24	7	168	8760	Y
5	Intake/Booking Officer 1	CO1	0500 to 1700	14	5	70	3650	Y
6	Int/Book Off 2 (weekend)	CO1	0000 to 1800	18	2	36	1877	Y
7	Classification Director	Lt		8	5	40	2086	N
8	Classification Officer	CO2	0800 to 0400	8	7	56	2920	Y
9	Exercise/Rec Officer	CO2	0900 to 0300	6	6	36	1877	Y
10	Housing Pod A1 Officer	CO1	0000 to 2400	24	7	168	8760	Y
11	Housing Pod A2 Officer	CO1	0600 to 2300	17	7	119	6205	Y
12	Housing Pod A3 Officer	CO1	0600 to 2300	17	7	119	6205	Y
13	Housing Pod B1 Officer	CO1	0000 to 2400	24	7	168	8760	Y
14	Housing Pod B2 Officer	CO2	0600 to 2300	17	7	119	6205	Y
15	Housing Unit Manager	Lt		8	5	40	2086	N
16	Jail Administrator	Capt		8	5	40	2086	N
17	Rover/Escort	CO1	0000 to 2400	24	7	168	8760	Y
18	Rover/Escort #2	CO1	0530 to 2400	18	7	126	6570	Y
19	Property Manager	Sgt		8	5	40	2086	N
20	Records and Backup	CO1	2130 to 1000	12	7	84	4380	Y
21	Visiting and Programs	CO1	0930 to 2230	13	6	78	4067	Y
22	Staff Breaks and Relief	CO1	1100 to 1330	2.5	7	17.5	912	Y
23	Staff Breaks and Relief	CO1	1630 to 1900	2.5	7	17.5	912	Y
24	Staff Breaks and Relief	CO1	0430 to 0630	2	7	14	730	Y
25	Court Escort #1	CO1	0600 to 1600	10	5	50	2607	Y
26	Court Escort #2	CO1	0700 to 1700	10	5	50	2607	y

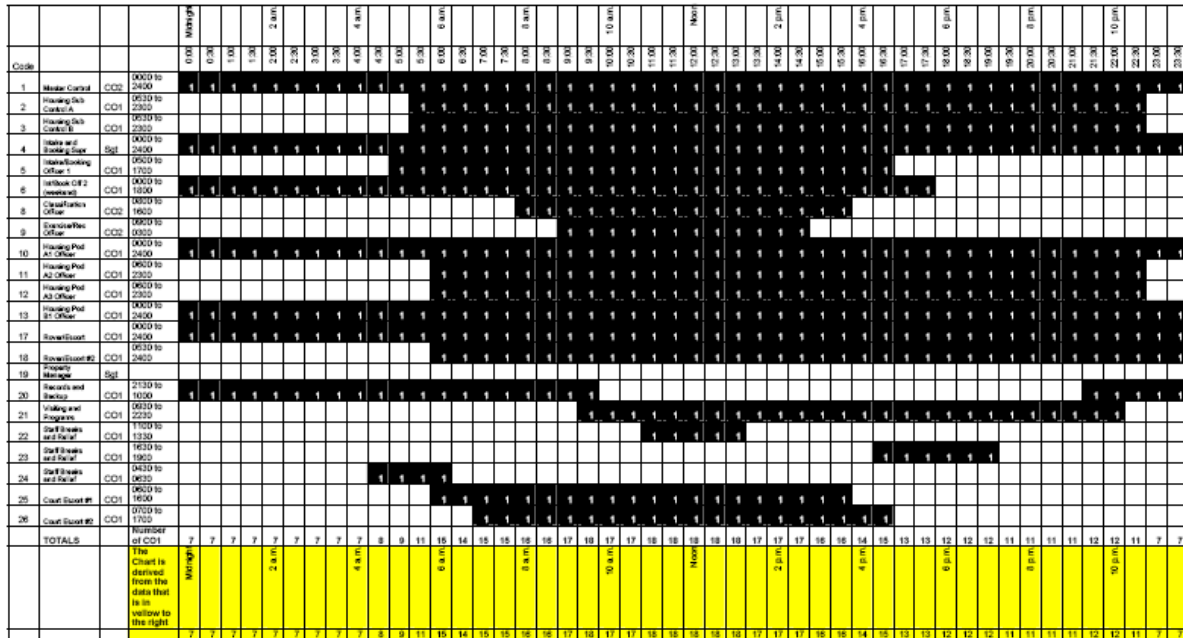
Column I is used to identify whether the activity is relieved or not. If the activity is always implemented, even when staff might be on vacation or out sick, it is considered relieved. Another way to determine if relief is required is to ask “if the person who is usually assigned to that activity or position does not report for work, does someone else take his/her place?” Many administrative positions are not relieved. Some lower-level positions are also not relieved. By identifying whether relief is provided, the calculation of Full-Time-Equivalent (FTE) staffing needs is facilitated.

The remaining columns in Form C are use to record annual hours for relieved activities, according to their staff classification (Columns J through N) and the number of FTE

positions for non-relieved activities (Columns O through S). At the bottom of the form, the Excel program will automatically total the number of annual hours and FTE's. When you enter the corresponding Net Annual Work Hours (NAWH) in the space at the bottom, the number of FTE's will be calculated.

Form C contains a wealth of information, but this is just a starting point. Figure 2 displays the information in columns A through I in a graphic format.

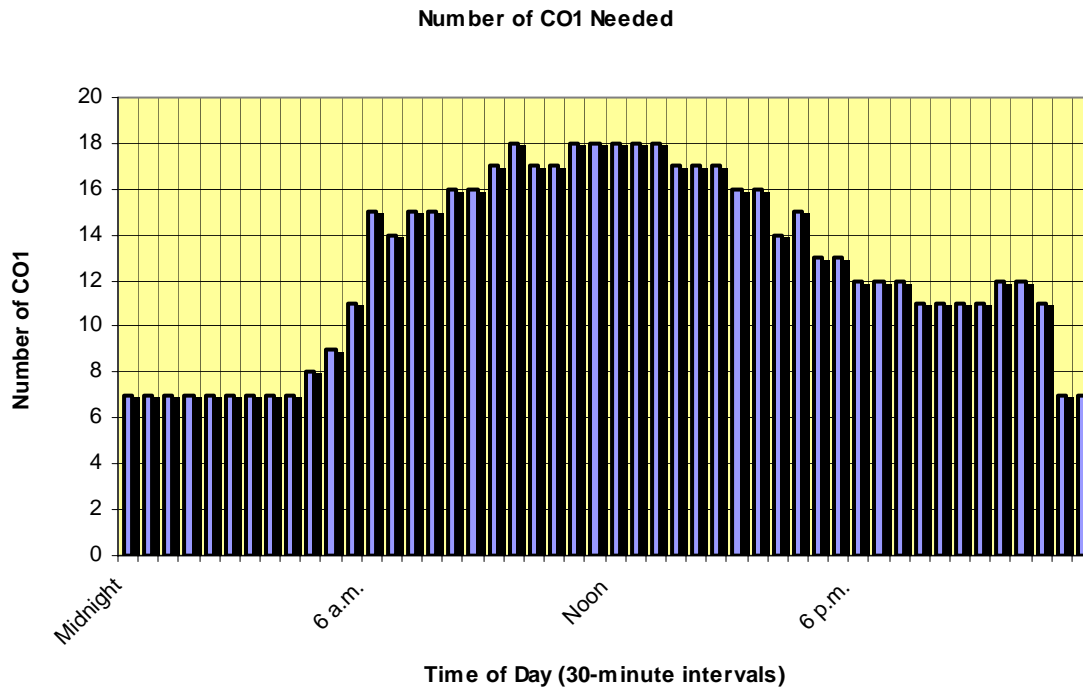
Figure 2: Coverage Worksheet (Form C)



By shading the hours that correspond to each activity, a graphic image is constructed. By entering the number “1” in each shaded cell, it is possible to calculate the total number of staff for each classification at the bottom of the worksheet. Note that a new worksheet should be developed for each classification of staff.

By taking the totals at the bottom of the worksheet, a chart may be created that shows the ebb and flow of coverage needs for each classification of staff, as shown in Figure 3.

Figure 3 offers an important tool that will be used in Step 6 (scheduling). The chart shows how much staff are actually needed, for each half-hour period of a twenty-four hour day. More important, these coverage needs have been developed by examining the activities and tasks associated with daily jail operation, and have not been influenced by scheduling considerations.

Figure 3: Graph of Coverage Levels

A note about schedules is in order at this point. Try to think of schedules as a means to an end. Schedules allocate individual staff members to specific time periods and days of the week. Coverage needs, as described here, represent what is really needed in the jail at a given time. An efficient schedule will assign the right numbers and types of staff to correspond with coverage needs, with a minimum amount of “slippage.” While some of us struggle to get enough staff, and really have no control of how much staff we are allocated, we *are* in control of how we use our personnel. Think of this coverage activity as a tool that might help you increase the effectiveness of your current resources—a tool to help you work smarter with what you already have.

It is at this point that we bring back a technique that was introduced in the First Edition of the *Workbook*. By calculating the number of coverage hours for each classification of staff, we create a benchmark from which the efficiencies of schedules may be evaluated. In Step 6 you will be calculating the number of *scheduled* hours, and comparing it to coverage needs. Invariably, there will be more scheduled hours than coverage hours, but the objective is to bring these two numbers as close together as possible. An efficient schedule might require only a few percent more scheduled hours than coverage needs. At the other extreme, we have seen schedules that call for nearly 30 percent more scheduled hours than coverage needs demand.

Developing an initial staff coverage plan is a trial-and-error process, so be patient and persistent. Make a first attempt, step back and review the results, and then try to find improvements. Be sure to identify all of the tasks and activities that need to be addressed. The *Workbooks* provide some helpful tools to remind you of the range of issues to be

considered. These and other tools are available at a new on-line staffing analysis clearinghouse, located at www.StaffingAnalysis.com.

Determining Minimum Coverage Needs.

Figure 3 shows the fluctuation in the number of staff needed to operate the facility for a 24-hour day. You will note that the lowest number of staff (7) occurs late and night into the early morning, essentially when inmates are locked down for the night. It makes sense that coverage needs would fall substantially when inmates are confined to their cells for the night.

You will need to evaluate the adequacy of this “minimum staffing level” to be sure that enough staff are available to handle the tasks, activities, and unplanned contingencies that are constant throughout each day and night, seven days each week. These include but are not limited to:

- Implementing ongoing prisoner supervision (15-, 30- and 60-minute checks)
- Admitting new prisoners
- Releasing prisoners
- Supervising and controlling prisoner movement
- Providing “backup” support for emergencies (e . g . , evacuating the building when there is a fire, and for planned uses of force such as cell extractions)
- Supervising staff
- Providing breaks for staff

The preceding narrative provides a brief introduction to the process of determining coverage. If you are able to separate your thinking from schedules, you will identify many opportunities for new efficiencies. Several resources and tools are available through the National Institute of Corrections at www.nicic.org, or through a new national clearinghouse at www.StaffingAnalysis.com. The clearinghouse is a free service provided by CRS, Incorporated, a non-profit organization (www.correction.org).

Rod Miller has headed CRS Inc. since he founded the non-profit organization in 1972. He is the author and co-author of numerous texts and articles on various aspects of jail planning, design, and operations. For more information, contact him at rod@correction.org, 925 Johnson Drive, Gettysburg, PA 17325, and (717) 338-9100.

John Wetzel is the warden of Franklin County Jail in Chambersburg, PA. For more information, contact him at jewetzel@co.franklin.pa.us, 625 Franklin Farm Lane, Chambersburg, PA 17201, and (717) 264-9513.

Evaluating the Coverage Plan

By Rod Miller, founder of CRS, a nonprofit organization created in 1972 to provide research, planning and publications for detention and corrections, and John Wetzel, warden of Franklin County Jail in Chambersburg, PA

This is the sixth of a series on staffing of jails. The articles explore the jail staffing analysis methodology developed by the National Institute of Corrections and enhancements that have been developed since NIC's latest workbook was published. The first five articles addressed the calculation of "Net Annual Work Hours," the development of a "Facility Activity Schedule," "Using Participation and Profiling to Improve Jail Staffing," and "Thinking Outside the Schedule: Determining Coverage Needs." This article examines the pivotal activities associated with evaluating coverage plans.

This series of articles builds on the pioneering staffing analysis methodology created by the National Institute of Corrections (NIC) and describes many enhancements developed since the NIC *Workbook*¹ was last revised. The NIC methodology has been embraced by jails throughout the United States and it has also been adopted by police, fire, transportation, health care and nursing home operations.

The methodology developed by the National Institute of Corrections (NIC) promotes a proactive and creative approach that has proven successful in jurisdictions of all sizes. In previous articles we have addressed the first four steps that comprise the 10-step NIC methodology:

- *Step 1. Profile the Jail*
- *Step 2. Calculate Net Annual Work Hours (first and second articles)*
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- *Step 10. Implement the Plan and Monitor the Results*

Step 5: Complete a Staff Summary. The fifth step in the staffing analysis process is by far the easiest. It asks you to step back and look at the magnitude of coverage needs you have identified and assemble your work products up to this point in the process. In some instances, it is necessary to go back with a sharper pencil and review the coverage levels because of budget realities. Completing Step 5 provides a "reality check" before spending the time and energy evaluating your work in the next step.

¹ **Staffing Analysis Workbook for Jails**, First Edition. Rod Miller and Dennis Liebert. National Institute of Corrections, Washington D.C. 1987. Second Edition published in 2003.

A New Step 6. In the Second Edition of the *Workbook*, the sixth step involves scheduling. But based on our experience with dozens of jails of all sizes in the past few years, we have concluded that the scheduling step should be delayed. Schedules allocate individual staff members to specific time periods and days of the week. Coverage needs, as described in the previous article, represent what is really needed in the jail at a given time, and provides the foundation on which an efficient schedule may be developed.

Before taking the time and expense of developing a schedule, and possibly raising the concerns of staff, it makes more sense to thoroughly evaluate your coverage needs.

You heard it here first-- there's a new Step 6 in town.

Evaluating the Coverage Plan

This step is the most important one in the process. In many ways, the staffing analysis process requires a "trial and error" approach through which you test various operational changes, organizational structures, coverage schemes, and schedules.

The evaluative step is critical for both the veteran staffing analyst and the first-time user. It allows you to examine your work systematically up to this point and to identify problems before a schedule is developed, a report is written and before the plan is implemented. This step is the "equalizer" that puts the first-time user on equal footing with someone who has completed many staffing analyses. More important, it ensures that your expertise is central to the completion of the staffing plan.

As we move this evaluative step earlier in the process, we also resurrect some effective tools from the First Edition of the NIC workbook. The earlier edition provided a more thorough approach to the evaluative process, in three components:

- A. Evaluate "internal" efficiency and consistency
- B. Complete the Evaluative Checklist
- C. Complete additional checklists and evaluative procedures (optional)

Completing the first two components is considered essential in this process. The third offers additional resources for those who find it necessary or desirable to expand on their evaluative efforts.

The evaluative process identifies problems or deficiencies with your coverage plan. As these are identified, you will need to return to earlier steps in the staffing analysis process to revise your work:

- In Step 1 (Profile) you should consider changing policies and practices to facilitate staffing efficiencies. This might include changes in separation (e.g. which inmates are allowed to participate in programs together) or how your

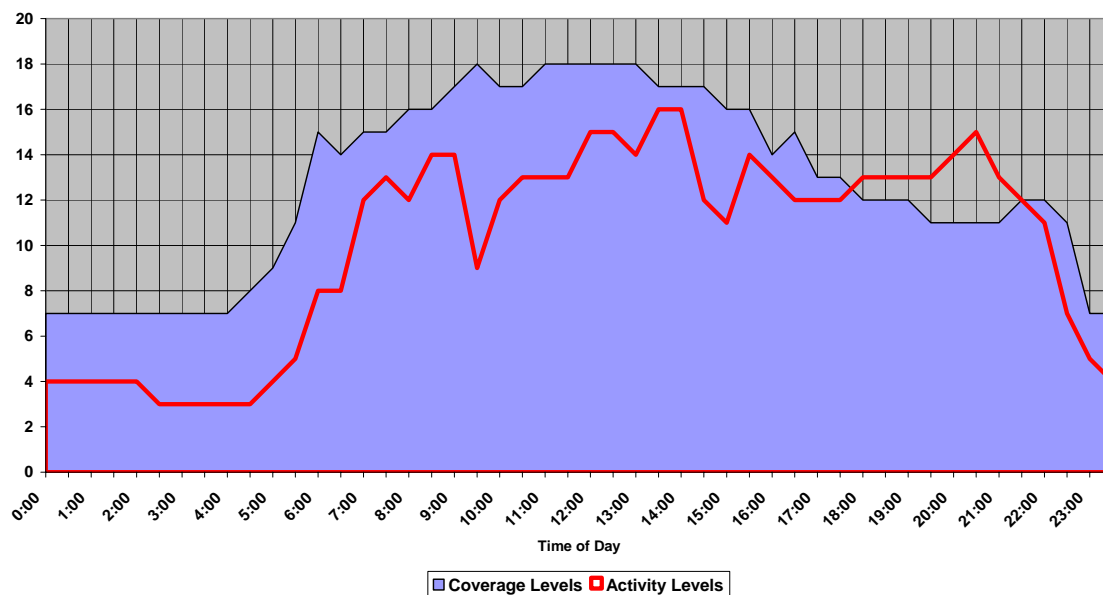
facility is used (e.g. which inmates are housed in specific areas) or many other refinements in how you operate the jail.

- In Step 2 (Net Annual Work Hours) you should consider ways to keep staff members at their posts, such as employing new training technology or reducing the use of sick time.
- In Step 3 (Activities) you should consider further refinements in your daily activity schedule to reduce the peak demands for staff, and you might want to move some activities to times when staffing demands are lower.
- In Step 4 (Coverage) you should identify additional efficiencies that ensure that staff are deployed only when they are really needed.

A. Evaluate "Internal" Efficiency and Consistency of Plan

The first component of the evaluation is to carefully review the work that has been recorded on several forms and graphs. The graph that you made in Step 3 of activity levels should be compared to the one you made of coverage levels in Step 4. While activities and coverage do not correspond on a one-to-one basis, comparing the two graphs helps identify inconsistencies.

Figure 1: Comparison of Activity and Coverage Levels



In Figure 1 you will note that from the hours of 1800 to 2200, the number of staff does not seem to correspond to the level of activities. This might suggest the need to modify either the activity levels or coverage, or perhaps a little bit of both. While it might seem easier to simply assign more staff, this will usually be the most expensive solution.

Modifying activities may be a bit more trouble, but it may produce new efficiencies. Changing an activity schedule may sometimes a “domino effect” in which a change might impact several other aspects of the activity schedule. But managers usually have more control over their operations than they have over their budget and finding ways to “work smarter” may pay off in many ways.

Figure 1 also suggests that coverage levels are significantly higher than activity levels for the first several hours of the day. This reflects the need for a minimum level of staffing to ensure the safety of inmates in the event of an emergency. Since activities levels are so low, there are opportunities to find ways to use the extra staff hours that must be deployed. This might involve moving more activities from the day and evening hours to the early morning, such as creating court lists, updating logs and records, and similar administrative tasks. It also offers opportunities for supplementing staff training through emerging technologies, such as computer-based learning. By training staff while they are on post, the Net Annual Work Hours (NAWH) would be increased.

The goal in this analysis is to provide enough staff at the right times, without maintaining higher levels of staffing when activities do not require them.

Many staffing plans will be deficient because too few staff are assigned. When this happens, tasks go undone, staff are overworked, and sometimes critical errors are made. Other staffing plans will be deficient because staff assignment does not drop when it can (based on activities). In these instances, all tasks are accomplished, but at a higher cost than might be necessary. Few jails have the luxury of assigning more staff than they need at any time of the day. When this happens, it usually means that there will be other times that are left with insufficient staffing resources.

If you have identified major deficiencies at this point, you may elect to correct them before you proceed with the evaluation. If you do, be sure to pick up this process where you left off.

B. Complete the Evaluative Checklist

The Evaluative Checklist provides a template for evaluating your staffing plan and its component parts from a variety of perspectives.

- Part 1 addresses internal consistency and plan efficiency
- Part 2 asks key questions concerning coverage
- Part 3 provides a method to assess operational adequacy
- Part 4 raises standards compliance issues
- Part 5 evaluates provisions for “backup”
- Part 6 suggests ways to secure broader review and comment
- Part 7 provides a summary chart for problems and an aid to diagnose the appropriate responses

Part 1 provides a format for comparing the consistency of your activity and coverage levels, such as the comparison graph in Figure 1.

Part 2 poses a series of key questions, such as:

- Does the plan present any conflicts with existing employee contracts or agreements?
- Does the plan pose any problems in terms of shift changes during key periods of the day?
- Is supervision provided for all staff at all times?

Part 3 applies a series of “scenarios” to your coverage plan to gauge its sufficiency. These ask you to “walk through” several operational procedures using the coverage plan. For each of the issues you should consider the steps involved with implementing the practice, with an emphasis on:

- Who is involved or responds?
- How long does the function take?
- What areas or functions are left uncovered?
- Are all involved staff qualified?

A shopping list of scenario topics is provided to get you started, including such activities as:

- Serving meals to all inmates under staff supervision
- Processing new arrivals
- Implementing inmate visiting
- Providing inmate exercise/recreation
- Conducting sick call
- Delivering inmate medication
- Conducting formal counts
- Implementing inmate programs
- Moving inmates to and from court
- Conducting staff meetings
- Exchanging inmate clothing and linen
- Distributing and collecting mail
- Conducting an evacuation drill

Part 4 examines compliance with standards. State standards provide one critical source of evaluation for coverage plans. More than half of the states have some form of jail standards. Professional standards have been promulgated by several organizations, including the American Correctional Association (ACA). A separate checklist has been developed around the ACA requirements.

For each issue that is identified in the standards, you will need to determine if your coverage plan allows you to comply with standards:

- At all times
- For every type of prisoner
- In all areas of the facility

Some of the issues identified through the standards include:

- Maintaining records and management information systems
- Providing continuing observation and around the clock supervision of inmate housing areas
- Providing enough staff to ensure prompt release from locked areas in the event of an emergency
- Maintaining a control center
- Providing assistance from another staff member whenever an officer enters a high security housing area
- Protecting inmates (from abuse, corporal punishment, personal injury, harassment)
- Implementing disciplinary procedures, reports, and hearings
- Conducting inmate classification
- Providing inmates with physical exercise

Part 5 asks you to look at your coverage plan in terms of the provision of “backup” for staff. To assess backup needs, you will be asked to consider a series of contingencies in various locations in the facility, such as:

- A disturbance in a cell area
- A combative prisoner in the booking area
- A fire requiring evacuation of the facility
- A planned use of force

For each of the contingencies you will pick a location, a day week and a time of day. You will consider how staff will react to the problem:

- Which staff will move to an area to provide backup?
- How long will it take?
- What areas are left uncovered as a result?

Part 6 guides you through a process of involving more people in the evaluation of the coverage plan. One of the best evaluative methods at this point in the process is to share the draft coverage plan with staff and officials and to solicit their comments and concerns. This will help to ensure that the plan is scrutinized from several perspectives.

You should consider seeking comments from:

- Line staff (including a sampling of those assigned to different posts)
- First line supervisors
- Mid-management staff
- Contract service providers (medical, education, counseling, etc.)
- Program and activity staff
- Administrative and clerical staff
- Support staff (maintenance, food service, etc.)
- Jail inspector

Some jails actually ask *all* staff to review and comment on coverage plans.

Part 7 provides a method for recording all of the deficiencies and concerns that have been identified, and analyzing each in terms of the potential solutions that should be considered. A "diagnostic" tool helps you determine which step(s) are needed to correct problems. Consider a "brainstorming" approach to improve your plan--assemble a team, put all the deficiencies on the table, and go to it.

C. Complete additional checklists and evaluative procedures (optional)

The Evaluation Checklist provides two additional evaluative resources as appendices. Each provides a more detailed and focused evaluation.

The ACA Standards Checklist converts elements of the professional standards developed by the American Correctional Association (Adult Local Detention Facilities - Fourth Edition) into a series of questions. Completing this checklist provides an indication of compliance with the professional standards and points to weaknesses with the breadth of services provided.

The Time/Task Analysis Worksheet is a more complicated tool. This worksheet offers a different perspective on the adequacy of the coverage plan. It requires delineating tasks to be completed at given times, determining the amount of time required to complete each task, and, after adjusting for "down-time," comparing required time with allocated staff. This tool has proven very effective in resolving disputes about the adequacy of staff at a specific post.

EVALUATE.... REVISE, Then EVALUATE AGAIN

The changes you make in response to deficiencies may create other problems. Evaluate revised coverage plans thoroughly. Use the results of secondary evaluations to guide further revisions. Continue with the "evaluate-revise-evaluate" loop until an evaluation yields satisfactory results. When your coverage plan receives a clean bill of health from an evaluation, you are ready think about scheduling.

Be sure to record all changes you make during the revision process, including changes in the jail setting (operations, facility). This will leave important "tracks" that will be helpful later in the process and in subsequent reviews.

Remember that developing a coverage plan is often a trial-and-error process, so be patient and persistent. Make a first attempt, step back and review the results, and then try to find improvements. The First and Second editions of the *Workbook* provide some helpful tools to remind you of the range of issues to be considered. New tools have been developed in the past few years. All of these tools are available at no cost at a new on-line staffing analysis clearinghouse, located at www.StaffingAnalysis.com. The clearinghouse is a service provided by CRS, Incorporated, a non-profit organization (www.correction.org).

Rod Miller has headed CRS Inc. since he founded the non-profit organization in 1972. He is the author and co-author of numerous texts and articles on various aspects of jail planning, design, and operations. For more information, contact him at rod@correction.org, 925 Johnson Drive, Gettysburg, PA 17325, and (717) 338-9100.

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Making Staff Schedules Meet Jail Coverage Needs: *Don't Let the Tail Wag the Dog*

By Rod Miller and John Wetzel,

This is the seventh article of a series on jail staffing analysis, exploring the methodology developed by the National Institute of Corrections and presenting enhancements developed since NIC's latest workbook¹ was published. This article begins our examination of the critical and sensitive process of developing and evaluating staff schedules.

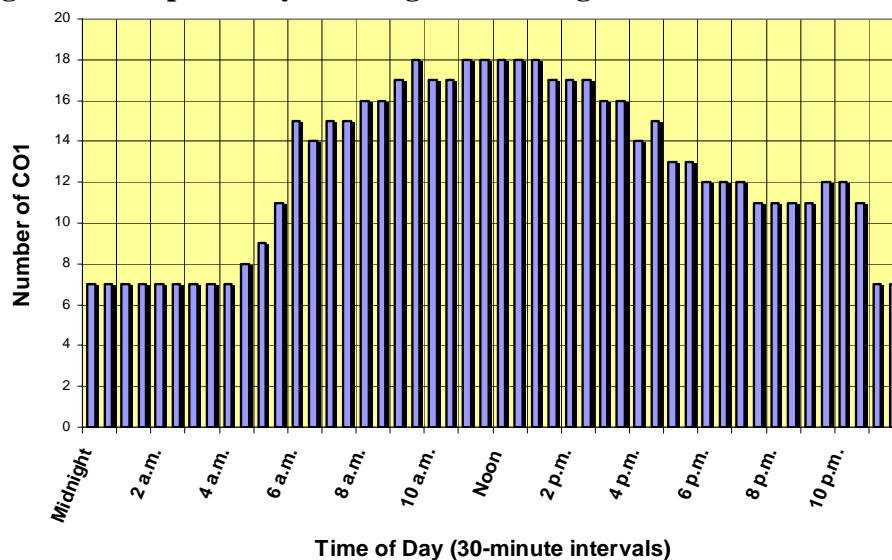
A good schedule efficiently meets jail coverage needs, but schedules often take on a life of their own and begin to drive operations, rather than respond to operations. We have encountered many jails where the schedule is the tail that is wagging the dog, by forcing operations to adapt to the schedule.

Coverage plan is the foundation on which the schedule is built

In an earlier article we urged readers to “think outside the schedule” and determine coverage needs without regard to scheduling issues. The result will be a coverage plan that reflects the varying needs for staff, hour to hour, day to day.

Form C from the NIC workbook develops a detailed coverage plan that looks at jail operations and staffing (coverage) needs for every 30-minutes during a week. Figure 1 shows a graph that is generated by Form C to display the ups and downs of coverage needs.

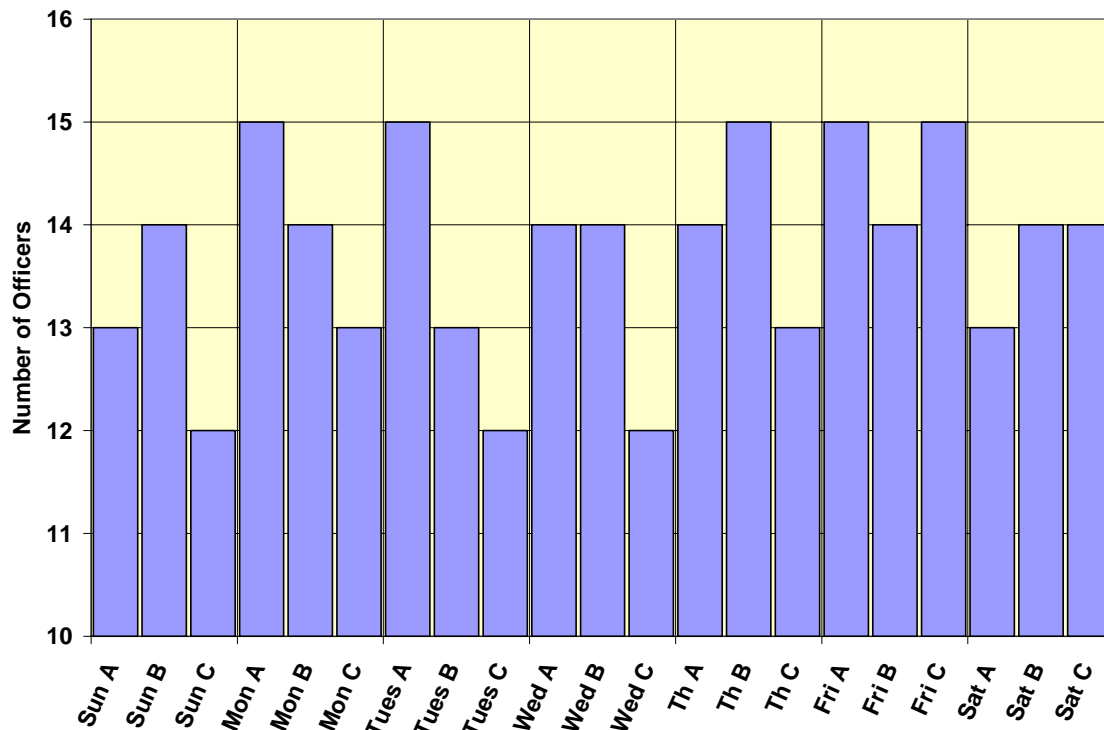
Figure 1: Sample 1-Day Coverage Plan Using 30-Minute Increments



¹ **Staffing Analysis Workbook for Jails**, First Edition. Rod Miller and Dennis Liebert. National Institute of Corrections, Washington D.C. 1987. Second Edition published 2003. The NIC methodology has been embraced by jails throughout the United States and has also been adopted by police, fire, transportation, health care and nursing home operations.

Using 30-minute or 60-minute units to examine coverage gives your pencil a fine point as you describe the ups and downs of daily jail operations and coverage needs. But for this article, we will pull back a bit further and look at larger units in order to simplify our explanation of the relationship between coverage and schedules. In Figure 2 is an example of a simplified coverage plan for a week that uses 8-hour shifts (A, B, C) to define coverage needs.

Figure 2: Simplified 7-Day Coverage Plan Using 8-Hour Shifts



In the last article we suggested that Step 7 (Evaluating) should come before Step 6 (Scheduling). Schedules allocate individual staff members to specific time periods and days of the week, while coverage needs (Step 5) represent what is really *needed* in the jail at a given time and provide the foundation on which an efficient schedule may be developed. Before taking the time and expense of developing a schedule, and possibly raising the concerns of employees, it makes sense to be sure you have a solid consensus of coverage needs.

Evaluating Current and Potential Schedules

Coverage Plan Is Key

How do you know whether your current schedule, or one you are considering, is appropriate? The starting point is to compare the *actual* deployment of staff according to the schedule to the *coverage* needs that you have previously identified. A good schedule provides the right numbers and types of staff, at all times, to meet identified coverage needs.

There are other considerations that contribute to the evaluation of a schedule. We suggest that schedules must be:

- *SUFFICIENT*. Providing at least as many staff for each hour of each day that has been determined in the coverage plan (and the right *type* of staff). The schedule should never assign fewer staff than are required by the coverage plan. Some jurisdictions refer to coverage needs as their “minimum” levels of staff, below which they cannot safely operate.
- *EFFICIENT*. Minimizing the number of “extra” staff deployed by the schedule (“extra” staff are the ones scheduled to work above the number required by the coverage plan).
- *CONSISTENT*. Minimizing variations throughout the schedule cycle.
- *ATTRACTIVE* to employees by meeting their needs, being considerate of their personal preferences, and offering incentives to stay with the organization.
- *HEALTHY*. Promoting staff physical well-being and performance.

We explore each of these evaluative perspectives by posing the questions that follow.

Is the Schedule Sufficient?

You cannot answer this question accurately without a coverage plan. But once you have one, you have an ideal tool to identify every instance that your schedule falls short of coverage needs. When you developed your coverage plan you identified the number and types of staff needed using a spreadsheet. This provided the basis for the mathematical calculations that are needed to determine the number of full-time-equivalent (FTE) staff needed in the budget. This spreadsheet technique proves just as effective and accurate when it comes to schedules. With this article, we introduce a new tool to be used to that end, which we will call “Form E.”²

Most jails operate with three, 8-hour shifts, or two 12-hour shifts.³ Although we have developed a version of Form E that uses 30-minute increments to examine coverage and schedules, we will use another variation-- using shifts as the unit of measure-- to illustrate the larger picture in this article.

To evaluate the sufficiency of a schedule according to shift assignment levels, Use Form E to identify the work days and off days for each staff member assigned to a shift. Use a “1” to record a work day, and a “0” (the number zero, not the letter o) to record a

² The NIC workbook provides forms A through D, therefore E is the logical label for this new tool.

³ Many jails use variations of 8-hour shifts to tailor scheduling to coverage needs, sometimes lengthening the shift beyond 8 hours, sometimes by moving the start- and end-times of a shift, or a combination of these techniques.

scheduled off day. Figure 3 provides a sample of Form E, using a shift that has 20 staff assigned to it.

Figure 3: Sample Form E - Excerpt (Top of Form)

Staff Member Code	Sun	Mon	Tues	Wed	Thur	Fri	Sat	Total Days Worked
1	0	1	1	1	1	1	0	5
2	0	0	1	1	1	1	1	5
3	0	1	1	1	1	1	0	5
4	0	1	1	1	1	1	0	5
5	0	1	1	1	1	1	0	5
6	0	0	1	1	1	1	1	5
7	1	0	0	1	1	1	1	5
8	1	0	0	1	1	1	1	5
9	1	1	0	0	1	1	1	5
10	1	1	0	0	1	1	1	5
11	1	1	1	0	0	1	1	5
12	1	1	1	1	0	0	1	5
(continue until all staff are shown) ▼								

1 = work day 0 = day off

When you are finished recording the work and off days for each employee, add the numbers in each column to determine how many persons are scheduled for each day (A). Enter the totals from the coverage plan below the scheduled coverage figures (B), and then calculate⁴ the difference (C) between scheduled staff and coverage needs with this simple formula:

Scheduled Hours <i>minus</i> Coverage Hours = Difference (plus or minus)

Figure 4 provides a sample of the bottom of Form E. This technique produces *quantifiable* results. A template for Form E is provided, along with this sample, at our national clearinghouse (www.staffinganalysis.com).

When the schedule falls below minimum coverage needs, the difference (C) will be a negative number. When the two numbers match, your schedule has efficiently provided the right number of staff to meet coverage needs. When there is a positive number, your schedule provides more staff than you have determined are needed. In others words, when the difference between scheduled hours and coverage hours is:

- a negative number, your schedule is *insufficient* to meet coverage needs
- a positive number, your schedule *exceeds* coverage needs
- zero, your schedule *matches* coverage needs

⁴ Form E has this, and other formulas, embedded in the template.

Figure 4: Sample Form E - Excerpt (Bottom of Form)

Staff Member Code	Sun	Mon	Tues	Wed	Thur	Fri	Sat	Total Days Worked
1	0	1	1	1	1	1	0	5
▼								
19	1	1	1	1	0	0	1	5
20	1	1	1	1	1	0	0	5
A. Total Scheduled	13	15	15	14	14	15	14	100 shifts scheduled
B. Total Coverage Needed	12	16	14	13	14	14	15	98 shifts needed
C. DIFFERENCE (B minus A)	1	-1	1	1	0	1	-1	2
D. <u>Shortfalls</u> (Schedule is <u>less</u> than coverage needs)		-1					-1	-2
E. <u>Excess</u> (Schedule is <u>over</u> coverage needs)	1		1	1		1		+4

Note that Form E posts negative numbers in one row, and positive numbers in another. This is necessary to ensure that you generate a separate count of positive and negative number, and not to combine them. The grand totals on the form indicate the number of hours under, and over, for the cycle.

The spreadsheet also provides the ability to *graphically* identify the hourly relationship between the schedule and coverage needs. The chart in Figure 4 was drawn from Rows A and B at the bottom of the spreadsheet. Whenever the schedule line falls below the coverage line, there is a problem with sufficiency.

At this point you may be wondering why the scheduled hours vary as they do. After all, if you schedule X staff for a shift, doesn't that always deliver X staff? The answer is "not *always*." Depending on several characteristics of your schedule, the number of assigned staff will vary-- sometimes markedly-- from day to day, and often from week to week. We will examine the math and mechanics associated with schedules in our next article.

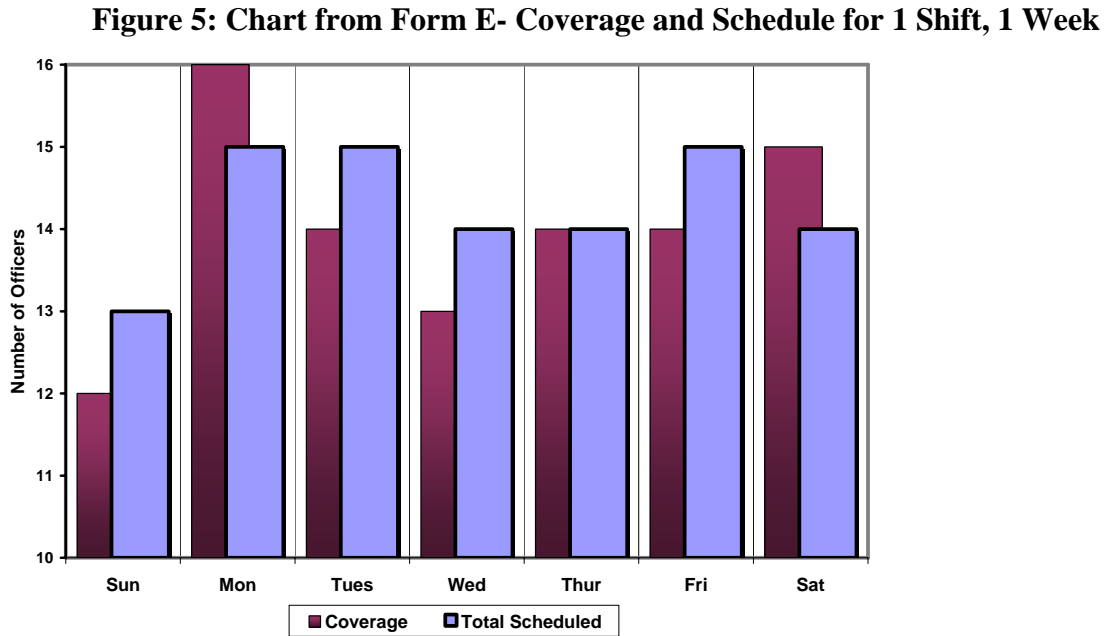
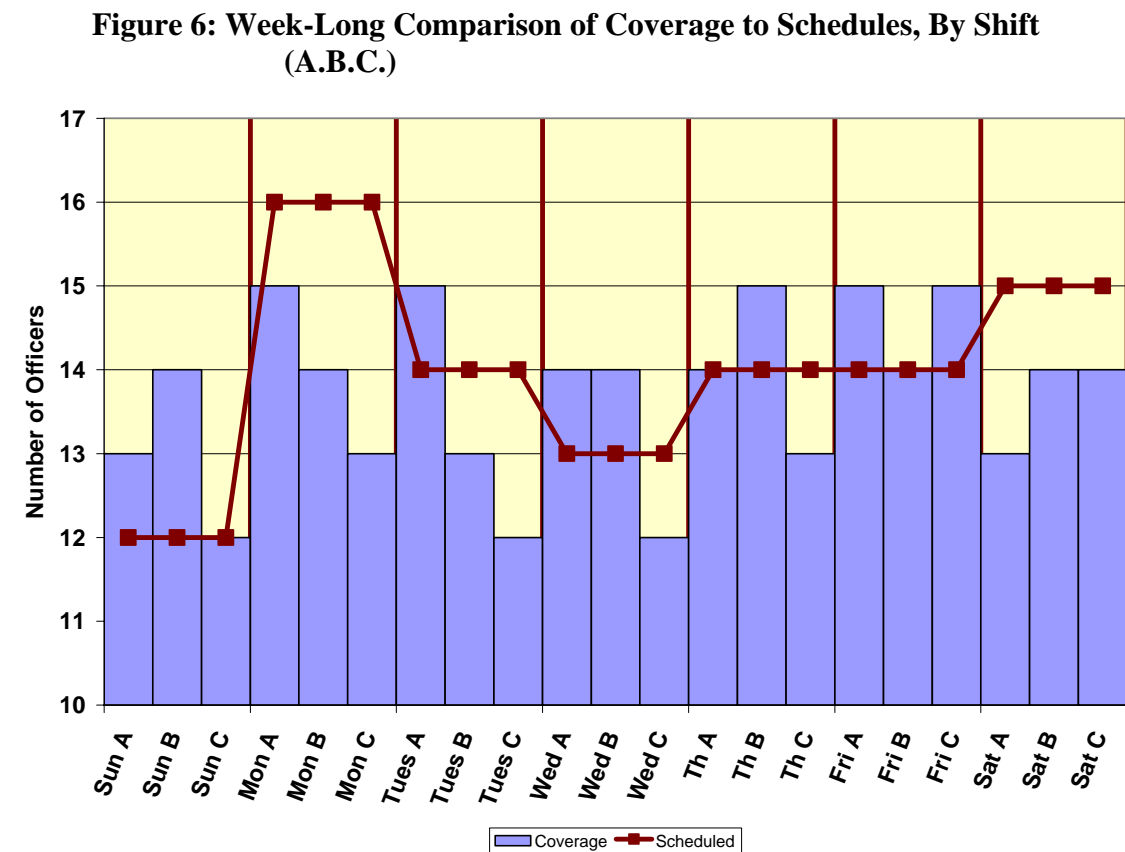


Figure 6 compares coverage and scheduled hours according to one shift for a week.



Is the Schedule Efficient?

Fortunately, the same techniques used to determine sufficiency also indicate efficiency. A negative number in our previous calculations told us that the schedule was insufficient. A positive number (see Figure 4) suggests that the schedule is *inefficient*. The positive figures and totals in Figure 4 numerically suggest the efficiency-- or lack of efficiency. Figures 5 and 6 graphically identify the times that the schedule exceeds coverage needs by showing where the line goes above the coverage needs.

Few jails have enough money to assign staff when they are not really needed. Sure, we can always use more staff at just about any time, but remember there are costs to these windfalls. For every hour that a staff member works above coverage needs, that hour is no longer available to be used to meet coverage needs at regular pay. When an employee's regular hours are used up, you must pay a 50% premium as overtime or compensatory time, and the costs will mount even faster.

Even worse than the potential costs, you might find yourself unable to replace the hours, leaving subsequent shifts short of staff, thereby creating inequities for your staff and increasing the risk to staff and inmates. This is where the numbers in Rows D and E come into play (Figure 4). The example in Figure 4 shows that 6 shifts fall outside of coverage needs (Row D and Row E, 2 below, 4 above). When we consider that the regular-time hours lost when we schedule extra staff (E) create the need for overtime hours, we realize that the sample schedule creates an overall premium of 9 shifts, not 6.⁵

Is the Schedule Consistent?

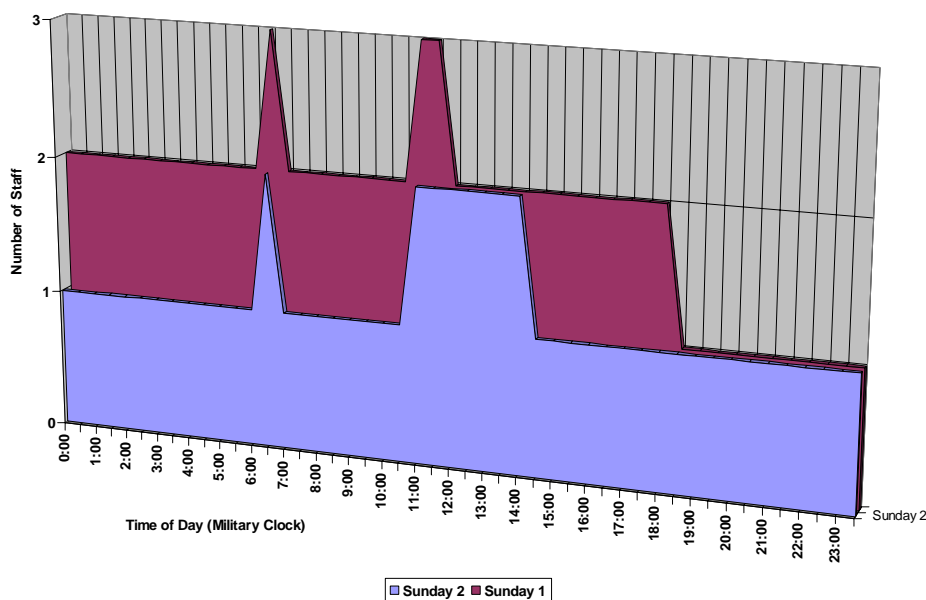
The mechanics of schedules are often deceiving. What looks simple and straightforward on paper sometimes produces erratic results from week to week during the cycle. We will explain scheduling math and mechanics in our next article. For now, consider a situation we recently encountered in a jail has a two-week schedule cycle. As we charted the actual hours and days worked, we discovered marked differences between staffing levels in the first and second weeks. Figure 7 provides an example of these inconsistencies.

Figure 7 is derived from a spreadsheet that records scheduled staff in 30-minute increments. By placing the first week of the cycle in front of the second week, we highlight the difference-- the inconsistency. It is not unusual to find such variations during the cycle of a schedule. When this occurs, it opens the door for budget officials to ask "If you get by with the lower number of staff during at those times in the second week, why do we need the additional staff in the first week?" But using the technique presented in Form E, you bypass such questions by evaluating the sufficiency and efficiency of each hour of each day against the underlying coverage needs.

⁵ Multiplying 6 by 1.5 yields a total of 9 shifts.

Figure 7: Example of Inconsistent Schedule (Two Week Cycle)

Scheduled hours for Week 2 are shown in front of Week 1

Is the Schedule Attractive to Staff?

In most jails it is difficult to find and retain qualified jail employees. We must be careful to ensure that our scheduling practices do not contribute to these challenges. Better yet, we should strive to adopt schedules that attract and help to retain staff.

Many jail employees are represented by a union or some sort of bargaining unit. Employee contracts often address specific scheduling criteria or issues. These contracts must be considered as you evaluate and improve schedules.⁶

We must be mindful of the many ways that our approach to scheduling may encourage or discourage prospective and current employees. If that were not difficult enough, we also need to acknowledge that our employees often do not agree among themselves when it comes to scheduling issues and preferences.

Here are some of the factors to consider when evaluating how attractive your schedule might be to your jail employees:

- *Length of work day.* Some employees do not want longer shifts, such as 12-hour shifts.
- *Number of days worked.* Some shift configurations require fewer days of work each week, such as 12-hour shifts.
- *Shift worked-- time of day.*⁷

⁶ The NIC Workbook recommends involving union representatives, along with other stakeholders, on the staffing analysis team.

- *Days off-- consecutive days.* Proponents of 12-hour shift configurations note that staff members actually work fewer days in the year, reducing transport cost and time and parking costs.
- *Days off-- weekend days.* Many schedules produce the same days off for each staff person throughout the year-- great for those who have one or two weekend days off, not so great for those who end up with no weekend days off)
- *Consistency from week to week with regard to days off.* Some schedules end up changing the days worked from week to week, making it more difficult for staff to adapt and to cope with their personal and family needs (but often resulting in a more equitable distribution of weekend days off).
- *Consistency from week to week with regard to work hours.* Some schedules employ a “swing shift” that overlaps two traditional shifts. This is sometimes unpopular with staff.
- *Something to work toward.* In addition to gaining seniority and moving into more desirable posts, employees who gain longevity in some jails are able to choose from a variety of shift configurations, such as a 4/10 (four, 10-hour days).
- *Work conditions.* Staffing levels are key factor when your employees characterize their work conditions. If some shifts provide insufficient staff, the employees who must work on those shifts are less satisfied with their working conditions.
- *Ability to use earned time off.* Some schedules require limits on the number of employees who may schedule time off

These are just *some* of the factors that make a schedule attractive to current and prospective staff. The best way to find out what is important to your staff is to ask them. Better yet, involve them with the evaluation and improvement of your schedule.

Does Your Schedule Promote Staff Health and Performance?

There is ample research to prove that some work schedules are unhealthy for staff, and that some schedules reduce the ability of staff to properly and consistently perform their duties. Some professionals believe that a 12-hour shift in a jail is too taxing for jail employees, causing their performance to fall off in the latter hours. Others are adamant that jail employees are perfectly capable of working effectively for 12 hours. The research is split on this question. Some jails require employees to work longer than 12 hours, often for 16 hours or more, and there is agreement that this is not only unhealthy but also poses higher risks of poor performance.

Health and performance considerations are associated with:

- Working an employee too long at one time
- Providing insufficient time between shifts to rest
- Changing work hours frequently (e.g. rotating staff from days to evenings and nights)
- Posing a higher likelihood that staff will be required to work overtime

⁷ Remember that some staff actually prefer to work afternoons or nights.

When it comes to evaluating health and performance issues, employees should be asked for their opinions, but managers should also be cautious. Some of the longer shift configurations (such as 12-hour shifts) are extremely attractive to employees for personal reasons (e.g. more days off) and sometimes for financial reasons (e.g. more time to work a second job).

We encountered one jail that adopted a 12-hour shift configuration, where staff had the same number of days off as they had on the job. The official who adopted this schedule cited the benefits for employees' families-- having more time at home-- as the primary consideration that prompted him to go to 12-hour shifts. But a survey of jail employees staff revealed that every one of them had used the time off to take a second job, and some even worked full-time in these other jobs. What was a well-intentioned gesture by the official produced a situation in which many employees reported for work tired and stressed.

We expect our employees to voice their self-interests and we should encourage that. That means that it is up to managers to speak for the jail and its operations. Making a schedule healthier for employees, and more likely to improve their performance, may not be popular with them. Managers and officials must balance employee interests with the needs of the jail.

Summary

This article launched our examination of schedules, starting with effective techniques to evaluate current and prospective schedules. We introduced a new tool (Form E) that quantifies and depicts the manner in which a schedule relates to underlying coverage needs. We also identified considerations that are more qualitative in nature. In the next issue we will explore the nuts-and-bolts math and mechanics associated with developing and refining schedules.

The materials identified here, along with many other resources, are available at no cost at our on-line staffing analysis clearinghouse: www.staffinganalysis.com.

The clearinghouse is a service provided by CRS, Incorporated, a non-profit organization (www.correction.org).

Rod Miller has headed CRS Inc. since he founded the non-profit organization in 1972. He is the author and co-author of numerous texts and articles on various aspects of jail planning, design, and operations. For more information, contact him at rod@correction.org, 925 Johnson Drive, Gettysburg, PA 17325, and (717) 338-9100.

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Glossary of Staffing Analysis Terms	
Coverage Plan	The description of the <i>minimum</i> numbers and types of staff needed to operate the facility at each hour of each day in the week.
Shift Configuration	<p>The combination of:</p> <ul style="list-style-type: none"> • Number of hours staff will work on a given shift • Start and end times for each shift • Number of days to be scheduled on and off <p>Many jails have more than one shift configuration.</p>
Schedule	The assignment of individual staff to shifts on specific days, using one or more shift configurations. The schedule assembles all of the shift configurations and matches them to employees.
Cycle	The number of consecutive days needed to reach the point at which the schedule repeats itself.

The Math of Shift Configurations

By Rod Miller, founder of CRS, and John Wetzel, Warden of the Franklin County Jail, Chambersburg, PA

This is the eighth article of a series on jail staffing analysis, exploring the methodology developed by the National Institute of Corrections and presenting enhancements developed since NIC's latest workbook¹ was published. This article continues our examination of the critical and sensitive process of developing and evaluating staff schedules.

In the previous article we emphasized the importance of determining coverage needs before developing or evaluating schedules. A good schedule efficiently meets jail coverage needs, but schedules often take on a life of their own and begin to drive operations, rather than respond to operations. We described methods to evaluate current and potential schedules in terms of:

- **SUFFICIENCY.** Providing at least as many staff for each hour of each day that has been determined in the coverage plan (and the right *type* of staff).
- **EFFICIENCY.** Minimizing the number of “extra” staff deployed by the schedule
- **CONSISTENCY.** Minimizing variations throughout the schedule cycle
- **ATTRACTIVENESS** to employees by meeting their needs, being considerate of their personal preferences, and offering incentives to stay with the organization.
- **HEALTH.** Promoting staff physical well-being and performance.

As we examine the math and mechanics associated with schedules, we will start with the big picture--shift configuration.

Shift Configurations

From a distance, scheduling often looks pretty simple-- pick your basic “shift configuration” which consists of:

- Number of hours that comprise a shift
- Start and end times for each shift
- Employee **Regular Days Off (RDO)**

¹ **Staffing Analysis Workbook for Jails**, First Edition. Rod Miller and Dennis Liebert. National Institute of Corrections, Washington D.C. 1987. Second Edition published 2003. The NIC methodology has been embraced by jails throughout the United States and has also been adopted by police, fire, transportation, health care and nursing home operations.

A growing number of jails use more than one shift configuration as a creative solution to meet staffing needs. For example, the 4/10 (4, 10-hour days) pattern may work for an officer assigned to supervise an 8-hour inmate work crew because a 10-hour shift allows time to set up and wrap up each day. Similarly, a 9- or 10-hour shift might fit better into the hours of coverage needed for court movement, transport, or other functions that span more than 8 hours.

The NIC staffing analysis methodology introduced the Net Annual Work Hours (NAWH) tool, to replace the less accurate “shift relief factor.” NAWH makes it much easier to use more than one shift configuration.

Many jurisdictions have adopted two 12-hour shifts with varying degrees of success and satisfaction. Some facilities have tried 12-hour shifts and decided to return to 8-hour configurations, while others are very pleased with 12-hour shifts. We have encountered several jurisdictions that moved to 12-hour shifts in response to chronic problems with scheduling staff for 8-hour shifts. Shortages prompted mandatory assignment of staff to extra shifts, often resulting in a 16-hour work-day when a staff member was required to work two consecutive shifts. Employees often support 12-hour shifts because they eliminate the possibility of working two consecutive shifts. There are many considerations associated with adopting 12-hour shifts. These will be explored in depth in a later installment of this series. For now, we will examine the characteristics of several different shift configurations.

The Math of Shift Configurations

Shift pattern variations are virtually limitless. One source of many examples is *The Manager’s Guide to Alternative Work Schedules—Second Edition*, by W.L. Booth. This book is available on loan from the NIC Information Center², or a copy may be purchased from the publisher, the Institute of Police Technology and Management.³

Because a jail is such a complex organization and staffing needs are often unique, adopting *varied* work schedules may be effective. Changing your shift configuration, or even adding another type of configuration for some of your coverage needs, can be emotional and initially difficult, but it may result in certain benefits, such as:

- Improved staff morale as job satisfaction increases
- Less turnover, less sick time, and improved quality and quantity of work
- Financial savings due to more efficient use of staff

Figure 1 is drawn from *The Manager’s Guide to Alternative Work Schedules*. It summarizes the descriptive statistics for 21 different alternative schedules and allows

² National Institute of Corrections Information Center, www.nicic.org. (800) 877-1461, (303) 682-0213

³ University of North Florida, 12000 Alumni Drive, Jacksonville, FL 32224-2678; <http://iptm.org>.

comparison of the features of each schedule. The chart depicts work schedules that range from 8- to 12-hour days. Scheduling patterns such as split shifts and flextime are not included on the chart, as they do not lend themselves to this type of analysis.

Figure 1: Descriptive Statistics for Alternative Work Schedules

		8-Hour Workday			9-Hour Workday	10-Hour Workday			12-Hour Workday	
Shift Schedule		5-2	5-2 Variable	3-2 7-2 5-2	5-2 5-3	4-3	4-3 3-4	4-2 4-3	3-3	4-4
Consecutive Time Required	-Hours per Day	8	8	8	9	10	10	10	12	12
	-Days Per Week	5	5	3, 5, 7	5	4	4	4	3	4
Workdays and Offdays in Cycle	-1st Shift	5-2	5-2	3-2	5-2	4-3	4-3	4-2	3-3	4-4
	-2nd Shift	5-2	5-2	7-2	5-3	4-3	4-3	4-3	3-3	4-4
	-3rd Shift	5-2	5-2	5-2	5-3	4-3	4-3	4-3	None	None
Schedule Work Cycle-	-Days Per Cycle	21	21	21	23	21	21	20	12	16
	-Cycles Per Year	17.33	17.33	17.33	15.83	17.33	17.33	18.2	30.33	22.75
Number of Workdays	-Per Shift	5	5	3,5,7	5	4	4	4	3	4
	-Per Cycle	15	15	15	15	12	12	12	6	8
	-Annually	260	260	260	237	208	208	218	182	182
Number of Offdays	-Per Shift	2	2	2	2 or 3	3	3	2 or 3	3	4
	-Per Cycle	6	6	6	8	9	9	3	6	8
	-Annually	104	104	104	127	156	156	8 146	182	182
Weekends Off Annually	-Full	52	0 to 26	34	14	52	52	10	16	18
	-Partial	0	0 to 26	0	14	0	0	18	18	12
Number of Other Offdays	-Holidays	9	9	9	8, 9-hour	7.2	7.2	7.2	6	6
	-Vacation	12	12	12	11, 9-hour	9.6	9.6	9.6	8	8
	-Compensatory	0	0	0	6	0	0	10	9	9
Total Scheduled Hours Annually	Workdays times	260	260	260	237	208	208	218	182	182
	Hours =	8	8	8	9	10	10	10	12	12
	TOTAL	2,080	2,080	2,080	2,133	2,080	2,080	2,180	2,184	2,184

Adapted from *The Manager's Guide to Alternative Work Schedules—Second Edition*, by W. L. Booth. Institute of Police Technology and Management. University of North Florida, 12000 Alumni Drive, Jacksonville, FL 32224-2678; <http://iptm.org>.

Evaluating alternative work schedules

When considering alternative work schedules, several factors should be weighed. Benefits and costs are often traded off as decisions are made.

- Hours of operation and timeframes. While many jail activities operate 24 hours per day, others may have substantially shorter hours (visiting areas, public reception, etc.). Examine each function of the jail to find out if different work schedules would be effective.
- Days operated each week. Many jail operations continue 7 days per week, but others may vary. For instance, a jail may operate an industry or work program that closes on weekends. Scheduling staff for these functions might require alternative approaches.
- Objectives of the organization. The goals and objectives of the jail may suggest appropriate scheduling. If the jail places a high priority on inmate visiting, visiting hours might be scheduled at the convenience of visitors, rather than staff. As a result, work schedules might change.
- Levels of activity. Different components of the jail might require more intense staffing. For example, maximum-security inmates are more difficult to supervise

during outdoor recreation, suggesting the need for additional staff. A creative staffing plan might provide more staff for that function through overlapping shifts.

- Employee contracts and labor laws. Any potential change in work schedules must be evaluated in light of existing contracts and laws. Involving labor representatives and legal counsel early in the process is advisable.
- Staff training. If it is difficult to provide in-service training for staff, alternative schedules (such as over-lapping shifts) may create new opportunities for this key activity.
- Fatigue and productivity. Research indicates that longer work days decrease productivity, but that corresponding shorter workweeks may offset fatigue. Alternative work schedules must be carefully weighed to ensure that staff are not overtired and less able to perform critical duties.
- Scheduling for different positions. Some new jobs created in the jail may be amenable to, or even require, alternative scheduling.

The decision to change your shift configuration will ultimately hinge on the assessment of their feasibility and on whether the changes can be implemented without too much disruption or negative reaction. The rewards for creative use of alternative work schedules are often great enough to overcome most potential logistical problems.

Changing shift configurations often *requires* negotiation with employees' bargaining units. But even if you are not required to negotiate changes in shift configurations, you should consult with employees and their representatives when you are considering changes. Solicit their suggestions and work with them to craft changes that work for them, as well as the facility.

The NIC staffing analysis process strongly suggests that you have union members or other employee representatives "around the table" throughout the process. Giving employees meaningful opportunities to shape changes in jail operations and scheduling not only brings important insights and ideas to the process, but also increases the likelihood that employees will accept the changes that result.

This article focused on the shift configurations, the first and biggest element of scheduling decisions. In the next issue we will examine the manner in which various shift configurations actually *schedule* individual employees and the consistency associated with shift configurations. We will also introduce a method that you may use to evaluate the consistency and efficiency of your current schedules.

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The materials identified in this article, along with many other resources, are available at no cost at our on-line staffing analysis clearinghouse: www.staffinganalysis.com.

The clearinghouse is a service provided by CRS, Incorporated, a non-profit organization (www.correction.org).

Rod Miller has headed CRS Inc. since he founded the non-profit organization in 1972. He is the author and co-author of numerous texts and articles on various aspects of jail planning, design, and operations. For more information, contact him at rod@correction.org, 925 Johnson Drive, Gettysburg, PA 17325, and (717) 338-9100.

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Glossary of Staffing Analysis Terms	
Coverage Plan	The description of the <i>minimum</i> numbers and types of staff needed to operate the facility at each hour of each day in the week.
Shift Configuration	The combination of: <ul style="list-style-type: none"> • Number of hours staff will work on a given shift • Start and end times for each shift • Number of days to be scheduled on and off Many jails have more than one shift configuration.
Schedule	The assignment of individual staff to shifts on specific days, using one or more shift configurations. The schedule assembles all of the shift configurations and matches them to employees.
Cycle	The number of consecutive days needed to reach the point at which the schedule repeats itself.
RDO	Regular days off. The specific days of the week that each employee will not be scheduled to work. In a 5-2 schedule (5 days on, 2 days off) the days will be the same each week. Other schedules, such as a 3-3 or 4-4 (often used for 12-hour shifts) will result in different days off each week until the cycle is complete and the schedule repeats itself.

Measuring the Efficiency of Schedules

Rod Miller, founder of CRS, and John Wetzel, Warden, Franklin County Jail, Chambersburg, PA

This is the ninth article of a series on jail staffing analysis, exploring the methodology developed by the National Institute of Corrections and presenting enhancements developed since NIC's latest workbook¹ was published. In this article, we focus on staff schedules again, introducing a new tool that measures scheduling efficiency.

Staffing costs represent more than half of jail operating costs, often more than 70% of the annual costs. Most jails cannot afford to waste any of their staffing resources, and a review of scheduling efficiency measures the extent to which hours are scheduled when they are not needed.

Believe it or not, there are times when more employees report for duty than are needed to meet coverage needs in some jails. Of course supervisors rarely complain about this windfall, and often find creative and effective ways to use the extra hours. But when employees work their regular hours but do not address coverage needs, it usually creates a shortfall later in the fiscal year.

Before we describe efficiency methodology, let's put the budgeting process in the context of the overall staffing analysis process.

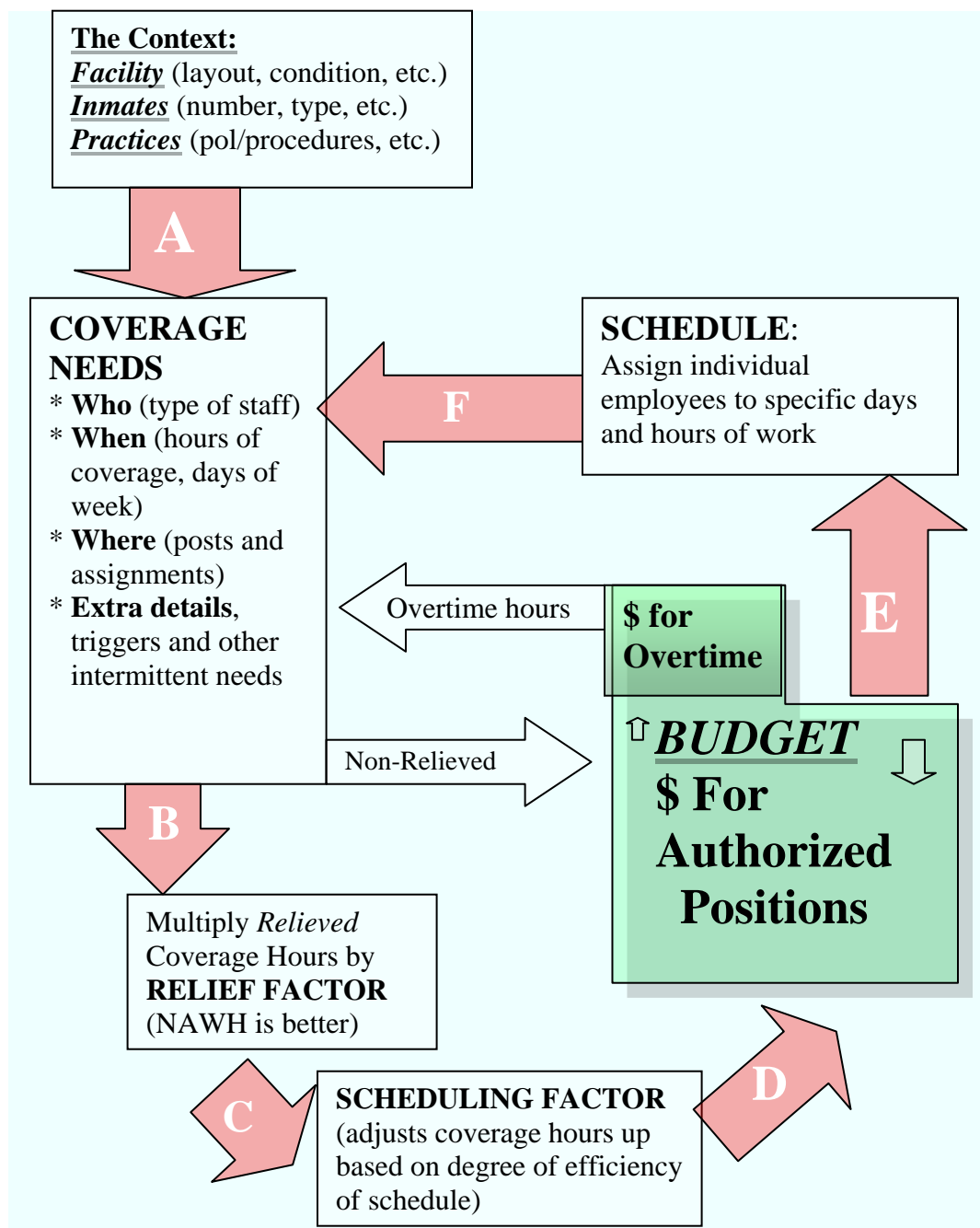
A Schematic Diagram of the Staffing Analysis and Budgeting Process

Figure 1 describes the process through which needs are identified, coverage is determined, and the "math" of calculating Net Annual Work Hours (relief factors) and determining budget needs.

The road to providing sufficient staffing is fraught with error. The following list describes *some* of the difficulties encountered in this process, using the letters on each arrow of the flowchart to indicate the point at which the difficulties are encountered:

- A. Incomplete or inaccurate characterization of the context. Not using data fully, not identifying changes and trends. The context needs to be updated yearly in order to avoid this error.
- B. Underestimating coverage needs by not evaluating sufficiency. Failing to find ways to "work smarter" with what we have (such as using staffing overages to cover needed details such as training or searches). Not using data to refine coverage needs.

¹ **Staffing Analysis Workbook for Jails**, First Edition. Rod Miller and Dennis Liebert. National Institute of Corrections, Washington D.C. 1987. Second Edition published 2003. The NIC methodology has been embraced by jails throughout the United States and has also been adopted by police, fire, transportation, health care and nursing home operations.

Figure 1: Staffing Analysis Flowchart

C. Inaccurate calculation of Net Annual Work Hours (NAWH) or “relief factor.” For example, if you have overestimated NAWH by ten percent and you have 100 FTE correctional officers, you will be 10 FTE short in your budget.

D. Inefficient schedule(s) and/or failure to account for the inefficiency of schedules.

E. Unable to fill authorized positions, or to keep them filled.

- F. Employees who are actually deployed are not fully effective due to fatigue, lack of training, lack of experience, and other factors.

These are just a few of the difficulties and deficiencies that may occur at *any* of these stages to reduce the adequacy of the staffing practices that are finally employed. Many jails wrestle with *most* of these issues and more.

Why Measure Scheduling Efficiency?

Our focus in this article is to demonstrate how schedules vary in their efficiency and to introduce a new methodology to calculate the efficiency of schedules to inform the budget-setting process. If your schedules are not 100% efficient, you must determine the extent to which employees' regular work hours are lost, and ask for sufficient budget resources to compensate.

Just as we calculate Net Annual Work Hours (NAWH) to identify the hours that employees are away from their posts with pay, measuring scheduling efficiency identifies the hours that employees' efforts are misplaced.

Back to Coverage as the Benchmark

Start by revisiting your coverage needs (Step 4 of the NIC process) to determine if they represent the "minimums" that are acceptable, or if they sometimes describe optimal staffing levels. Ask yourself whether any lower level of staffing would result in unsafe or insecure operations. If the answer is yes, then your coverage levels are minimums.

Identify Minimum Staffing Levels

If your coverage needs do not represent "minimums", you will need to establish minimum levels of staffing for each shift and each day of the week. These minimums provide the bottom line below which staffing levels must not drop. Minimum staffing levels will vary from shift to shift, and sometimes from day to day.

Describe Staffing Levels and Contingencies

Written policies and procedures must anticipate various contingencies that will be encountered, providing clear instructions for each situation. These contingencies will include times when:

- Staffing levels are temporarily below minimums
- Staffing levels are temporarily higher than coverage needs prescribe

When staffing levels fall short of minimums, supervisors must know what steps are to be taken, such as:

- Instituting mandatory overtime to fill vacancies

- Calling part-time personnel to fill vacancies
- Operating below minimum levels and altering operations to compensate for staffing shortfalls (e.g. which post[s] may be unfilled, what services or activities are to be suspended)

Some jails encounter chronic problems filling their shifts. Although budgets authorize sufficient positions, they are not able to hire and retain enough employees to fill the roster. Overtime is used to fill shift vacancies, but employees have limits to the number of hours and days they may safely work. These jails often set up a hierarchy of operational decisions that respond to the actual level of staffing that occurs on each shift, such as:

1. One employee short on Shift A, Tuesdays: Suspend inmate outdoor recreation.
2. Two employees short on Shift A, Tuesdays: Suspend inmate programs.
3. Three employees short on Shift A, Tuesdays: Suspend inmate visitation.
4. Four employees short on Shift A, Tuesdays: Close program center.

This approach reduces the levels of activities, and even closes certain areas of the facilities, in response to staff shortages. Another facility has a procedure for implementing “rolling lockdowns” when insufficient numbers of employees are available, confining inmates to their cells and reducing staffing levels in response.

Practices Must be Consistent

Policies, procedures and post orders provide the foundation for jail operations. Failing to consistently comply with these directives erodes the safety and security of the jail, and exposes all parties to liability. Daily practices must comply at all times and under all circumstances.

Two Approaches to Scheduling Staff

Scheduling is the process of assigning individual employees to specific hours and days of work:

1. Assigning the exact number of employees to match the minimum staffing levels for each shift.
2. Assigning extra employees in anticipation of absences (in effect “overbooking” a shift anticipating that some employees will not appear for work every time they are scheduled).

The first approach relies on employees who are working overtime, or part-time employees, to fill intermittent vacancies on shifts and ensure sufficiency.² This approach rarely results in scheduling inefficiencies because the number of employees who report for duty does not exceed the minimum levels.

² In some larger facilities, some employees are scheduled to be part of a “pool” that is available to backfill vacancies as needed, using regular hours instead of overtime or part-time employees.

The second approach acknowledges that employees have many reasons for failing to report for a given shift. As a rule of thumb, an employee will not be available for 15 to 20 percent of the days for which he/she is scheduled. The Net Annual Work Hours (NAWH) calculations reflect this phenomenon.

In practice, the second approach will produce more shifts above minimum but *either* approach may result in inefficiencies depending on the shift configuration that is used. Scheduling poses a difficult balancing act between sufficiency and efficiency.

Shift Configurations

In the last issue we examined “shift configurations” which consists of:

- Number of hours that comprise a shift
- Start and end times for each shift
- Employee Regular Days Off (RDO)

We noted that many jails use more than one shift configuration as a creative solution to meet staffing needs. Now we provide a tool to evaluate the efficiency of various shift configurations. Each shift configuration will bring its own challenges in terms of efficiencies. Also, the number of employees who are to be scheduled often creates inefficiencies when combined with the shift configuration. Consider Figure 2, which schedules 9 employees for 8-hour shifts. The total number of employees who appear each day varies from 5 to 7.

Figure 2: Illustration of 8-Hour Shift Schedule with 9 Employees

Staff Name	Mon	Tues	Wed	Thur	Fri	Sat	Sun	Weekend Days Off
1. Carole	X	X	X	X	X	O	O	2
2. Larry	X	X	X	X	O	O	X	1
3. Jean	X	X	X	O	O	X	X	0
4. Moe	X	X	O	O	X	X	X	0
5. Rudolph	X	O	O	X	X	X	X	0
6. Susan	O	O	X	X	X	X	X	0
7. James	O	X	X	X	X	X	O	1
8. Barbara	X	X	X	X	X	O	O	2
9. Nancy	X	X	X	X	O	O	X	1
TOTAL On Schedule by Day	7	7	7	7	6	5	6	(7)

But if only 7 employees were being scheduled (Figure 3), the number who appear each day would be the same (5). This demonstrates the impact that the number of employees may have on the consistency of a schedule, and ultimately on the efficiency of a schedule. When using a 5 on- 2 off shift configuration, multiples of 7 employees will produce level results.

Figure 3: Illustration of 8-Hour Shift Schedule with 7 Employees

Staff Name	Mon	Tues	Wed	Thur	Fri	Sat	Sun	Weekend Days Off
1. Carole	X	X	X	X	X	O	O	2
2. Larry	X	X	X	X	O	O	X	1
3. Jean	X	X	X	O	O	X	X	0
4. Moe	X	X	O	O	X	X	X	0
5. Rudolph	X	O	O	X	X	X	X	0
6. Susan	O	O	X	X	X	X	X	0
7. James	O	X	X	X	X	X	O	1
TOTAL On Schedule by Day	5	5	5	5	5	5	5	(4)

Similarly, many 12-hour shift configurations operate with teams that work opposite schedules.³ When the total number of employees on the two teams is an even number, the resulting schedule will provide level staffing levels, while an odd number of staff assigned to the two teams will produce different levels of staffing half of the time.

Measuring Schedule Efficiency

As with measuring sufficiency, the coverage plan is the foundation for measuring efficiency. If your coverage plan does not represent your minimum staffing levels, your minimums will be used instead.

When you developed your coverage plan (Step 4 of the NIC process) you identified the number and types of staff needed using a spreadsheet. This provided the basis for the mathematical calculations that are needed to determine the number of full-time-equivalent (FTE) staff needed in the budget. In our seventh article, we introduced a new tool, "Form E."⁴

To evaluate the sufficiency of a schedule according to shift assignment levels, Use Form E to identify the work days and off days for each staff member assigned to a shift. Use a "1" to record a work day, and a "0" (the number zero, not the letter o) to record a scheduled off day. Figure 4 provides a sample of Form E, using a shift that has 20 staff assigned to it.

When you are finished recording the work and off days for each employee, add the numbers in each column to determine how many persons are scheduled for each day (A). Enter the totals from the coverage plan below the scheduled coverage figures (B), and

³ An example is the 4/3, 3/4 schedule that repeats every two weeks. Team 1 would have the first four days off, while Team 2 would be working those four days. Team 1 would work the next three days while Team 2 is off. Another balanced shift configuration would be a 4/4, 3,3.

⁴ The NIC workbook provides forms A through D, therefore E is the logical label for this new tool.

then calculate⁵ the difference (C) between scheduled staff and coverage needs with this simple formula:

$$\text{Scheduled Hours } \textit{minus} \text{ Coverage Hours} = \text{Difference (plus or minus)}$$

Figure 4: Sample Form E - Excerpt (Top of Form)

Staff Member Code	Sun	Mon	Tues	Wed	Thur	Fri	Sat	Total Days Worked
1	0	1	1	1	1	1	0	5
2	0	0	1	1	1	1	1	5
3	0	1	1	1	1	1	0	5
4	0	1	1	1	1	1	0	5
5	0	1	1	1	1	1	0	5
6	0	0	1	1	1	1	1	5
7	1	0	0	1	1	1	1	5
8	1	0	0	1	1	1	1	5
9	1	1	0	0	1	1	1	5
10	1	1	0	0	1	1	1	5
11	1	1	1	0	0	1	1	5
12	1	1	1	1	0	0	1	5
(continue until all staff are shown) ▼								

1 = work day 0 = day off

Figure 5 provides a sample of the bottom of Form E. This technique produces *quantifiable* results. A template for Form E is provided, along with this sample, at our national clearinghouse (www.staffinganalysis.com).

When the schedule falls below minimum coverage needs, the difference (C) will be a negative number. When the two numbers match, your schedule has efficiently provided the right number of staff to meet coverage needs. When there is a positive number, your schedule provides more staff than you have determined are needed. In others words, when the difference between scheduled hours and coverage hours is:

- a negative number, your schedule is *insufficient* to meet coverage needs
- a positive number, your schedule *exceeds* coverage needs
- zero, your schedule *matches* coverage needs

⁵ Form E has this, and other formulas, embedded in the template.

Figure 5: Sample Form E - Excerpt (Bottom of Form)

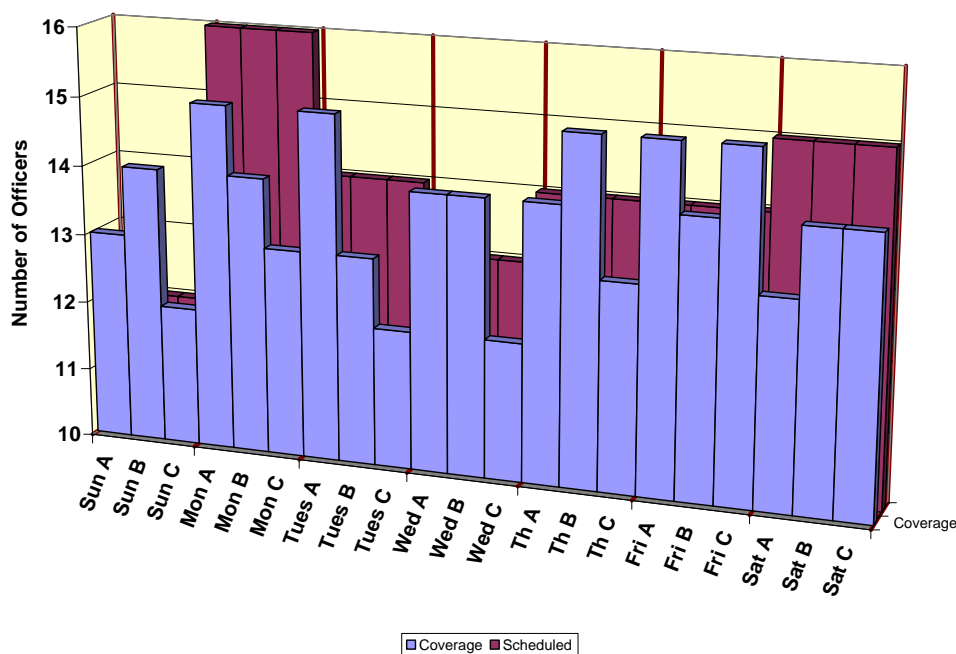
Staff Member Code	Sun	Mon	Tues	Wed	Thur	Fri	Sat	Total Days Worked
1	0	1	1	1	1	1	0	5
▼								
19	1	1	1	1	0	0	1	5
20	1	1	1	1	1	0	0	5
A. Total Scheduled	13	15	15	14	14	15	14	100 shifts scheduled
B. Total Coverage Needed	12	16	14	13	14	14	15	98 shifts needed
C. DIFFERENCE (B minus A)	1	-1	1	1	0	1	-1	2
D. <u>Shortfalls</u> (Schedule is <u>less</u> than coverage needs)		-1					-1	-2
E. <u>Excess</u> (Schedule is <u>over</u> coverage needs)	1		1	1		1		+4

Note that Form E posts negative numbers in one row, and positive numbers in another. This is necessary to ensure that you generate a separate count of positive and negative number, and not to combine them. The grand totals on the form indicate the number of hours under, and over, for the cycle.

The spreadsheet also provides the ability to *graphically* identify the hourly relationship between the schedule and coverage needs.

Is the Schedule Efficient?

Fortunately, the same techniques used to determine sufficiency also indicate efficiency. A negative number in our previous calculations told us that the schedule was insufficient. A positive number (see Figure 5) suggests that the schedule is *inefficient*. The positive figures and totals in Figure 5 numerically suggest the efficiency-- or lack of efficiency. Figure 7 graphically identifies the times that the schedule *exceeds* coverage needs by showing where columns in the rear (scheduled hours) are higher than the coverage needs in the front. The extent to which the scheduled hours in the back appear suggests the degree to which the schedule exceeds coverage needs.

Figure 6: Coverage Needs Compared to Scheduled Hours

Few jails have enough money to assign staff when they are not really needed. Sure, we can always use more staff at just about any time, but remember there are costs associated with these windfalls. For every hour that a staff member works above coverage needs, that hour is no longer available to be used to meet coverage needs at regular pay. When an employee's regular hours are used up, you must pay a 50% premium as overtime or compensatory time, and the costs will mount even faster.

Next time, we'll add the "math" to these calculations by looking at some actual practices of jails around the country, and there-by showing you, how to create, a *Scheduling Factor*.

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Comparing NAWH and “Relief Factor” Calculations

By Rod Miller, founder of CRS, and Warden John Wetzel Franklin County Jail, PA

This is the tenth article on jail staffing analysis, exploring the methodology developed by the National Institute of Corrections and presenting enhancements developed since NIC’s latest workbook¹ was published. In this article, we take a break from our examination of scheduling challenges to clarify some of the math associated with relief calculations and to introduce some new tools.

We interrupt our examination of schedules to respond to a groundswell of requests to clarify the relationship between Net Annual Work Hours (NAWH) and the older concepts of a “Shift Relief Factor” (SRF) and “Relief Factor” (RF). This article addresses the confusion and provides examples, formulas and access to a new tool.

The NAWH methodology was introduced by NIC in 1987, providing a more accurate and versatile tool to calculate the math associated with relieved posts and positions. The end product of the NAWH calculations has many and varied uses, and is expressed as “hours” rather than “days.” Figure 1 provides a side-by-side comparison of the two methodologies.

Figure 1: Comparing NAWH and Relief Factors

	Relief Factor (RF)	Net Annual Work Hours (NAWH)
Unit of Measure	Days	Hours
Changes with shift configuration?	Yes, a new RF must be calculated for each different shift length	No, applies to all shift configurations
Number of “Time Off” Deductions Typically Considered	8 to 10 categories, measured in days	15 and more, in some agencies more than 30 categories of deduction are included, measured in hours
Product of the calculation	A number that describes the number of full-time employees needed to cover a specific shift with relief	The number of hours that each classification of employee is actually available to work his/her post annually
Uses	Calculates numbers of FTEs needed for a post/position	(1) Defines FTE for each classification of employee (2) Used as denominator to determine FTEs needed for varied coverage patterns (3) Provides guidance for shift construction and employee assignment

¹ **Staffing Analysis Workbook for Jails**, First Edition. Rod Miller and Dennis Liebert. National Institute of Corrections, Washington D.C. 1987. Second Edition published 2003. The NIC methodology has been embraced by jails throughout the United States and has also been adopted by police, fire, transportation, health care and nursing home operations.

Some jurisdictions still use the relief factor methodology, and need to be able to convert NAWH to RF for comparison purposes. Similarly, those who have converted to NAWH may need to compare previous RF calculations with their newer NAWH findings.

What a Relief!

Remember, either methodology is only used when a post or position is relieved. Relief means that a post or position is filled by another employee when the primary person assigned to it is not able to work. Relief sometimes implies that a post or position is staffed every day of the week. Relief is synonymous with “continuous.”

When a post or position is relieved, it is important, and difficult, to determine what budget resources are needed to staff it.

Definitions

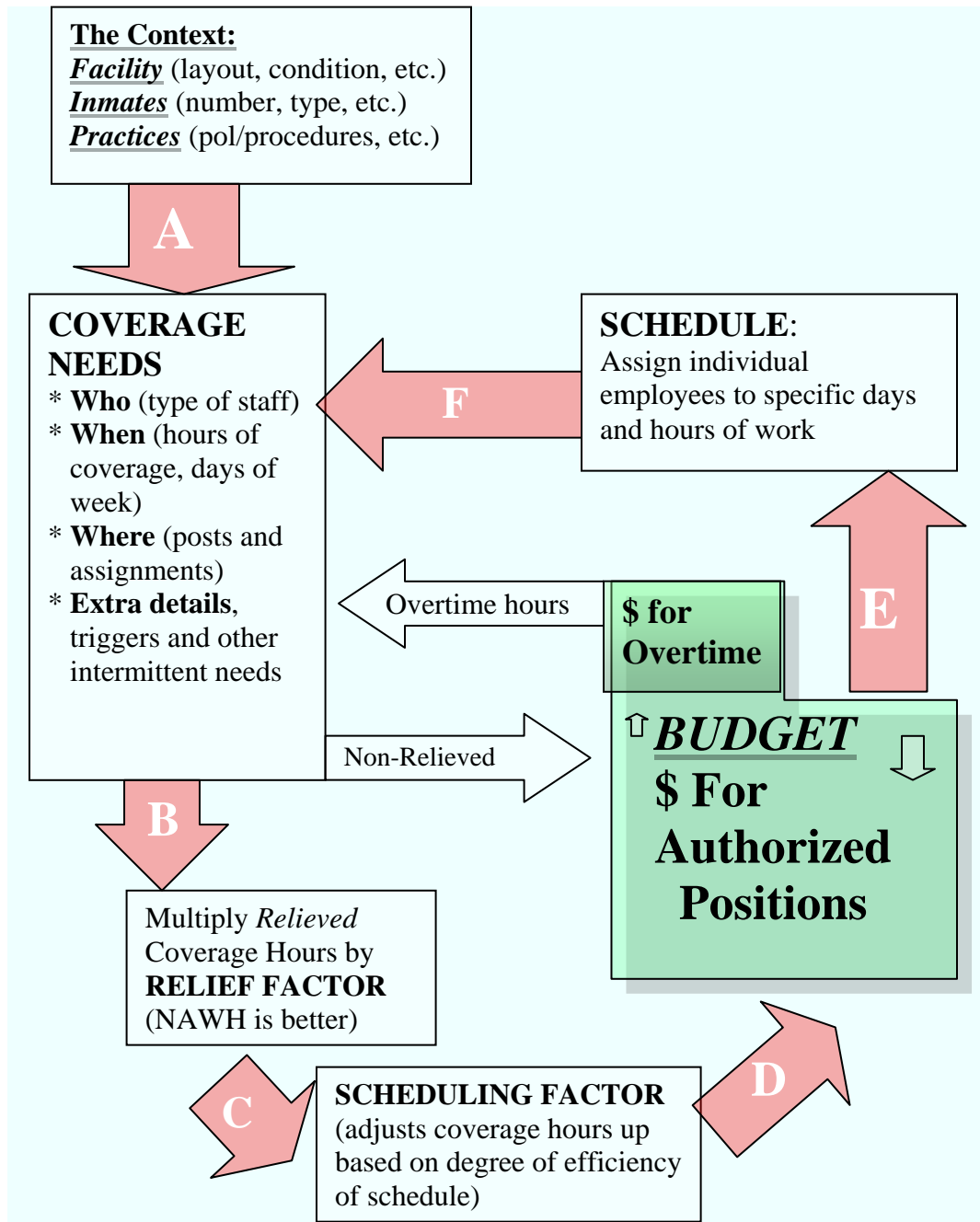
A “relief factor” attempts to answer the question: “How many full-time staff must I have in my budget to provide continuous coverage for a relieved post, using a specific shift configuration (length of shift)?” Relief factors are usually calculated for posts that are operated 24 hours daily, every day of the year. But calculating a relief factor becomes very difficult, and less accurate, when a variety of post configurations are considered. Some posts operate for only part of the 24-hour day, and some posts are not operated every day of the week.

In the past, a typical jail had only one shift configuration, such as 5, 8-hour shifts. But we have found that one size does not fit all, and the modern jail typically uses a variety of shift configurations to efficiently address needs. Using a relief factor in this context is often confusing—and is often inaccurate. A case in point: one county recently concluded it only required 4.1 full-time positions to staff 2, 12-hour shifts, 365 days per year (in fact, they needed 5.48). They made math errors when they tried to adapt their old shift relief factor (derived from 8-hour shifts) to their new 12-hour shifts. This is a common error made as managers try to apply relief factor methodology to alternative shift patterns.

The NAWH method introduced in the NIC Workbook accomplishes the same goals, more accurately, and with much more flexibility. By focusing on the “hour” as the unit to be measured, rather than a shift or a day, the process has been improved. The NAWH methodology also yields a product that is versatile and is effectively used in other areas of the staffing analysis.

What Do These Calculations Tell Us?

As suggested in Figure 1, a Relief Factor is a number that represents the number of full-time employees needed to provide coverage for a specific relieved post or position. An RF calculated for an 8-hour shift does not apply to any other length of shift. Every time the shift configuration changes, the RF must be recalculated—leading to more opportunities for error. The RF calculations are based on the number of “days” a typical employee has off for leave, training, and other activities.

Figure 2: Staffing Analysis Flowchart

The NAWH expresses the number of hours an average employee in a classification (such as Correctional Officer) will actually report for deployment during the year. It is the “net” number of hours that the employee is available to work. The NAWH calculations are based on the number of hours employees are away from their posts with pay. One agency with which we worked recently was able to provide data for more than 30 distinct categories of time away from post, thanks to the efforts of their payroll and human resources colleagues. The more data available, the more accurate the result.

The NAWH figure represents a “full time equivalent” (FTE). An FTE in budgeting jargon refers to the equivalent number of hours worked by a full-time employee for each classification of employee.

Why are these numbers so important?

At first glance, these calculations seem to only have relevance to the budget process. That’s true. But the budget is the source of all of our staffing resources—full-time employees, part-time employees, and overtime. If you do not ask for sufficient resources at the beginning of each budget year, you will certainly run short before the year ends. Further, if you want to increase training, for example, you will need to adjust the NAWH to ensure that funds are requested. And securing approval for your budget request will be bolstered by the comprehensive and accurate NIC methodology. The budget director in a large jail system recently asked for a “chain of evidence” that tied each dollar in the staffing budget request, to the hours and posts worked in each facility. The NIC process easily provided that level of detail, and connected the coverage needs to scheduling, and eventually to the budget request.

Figure 2 describes the process through which staffing needs are determined, budgets are forged, and staffing resources are eventually deployed. NAWH and RF both address the calculations shown in the arrow labeled B. But the NAWH is also used in other steps in the process, further refining the accuracy of your efforts.

How do I convert and compare?

To compare NAWH and RF, you must be able to convert one to the other. Figure 3 provides a sample of the results when NAWH is converted to SRF and RF.

Figure 3: Example of Net Annual Work Hours (NAWH) Compared to “Shift Relief Factor” (SRF) and “Relief Factor” (RF)

A	B	C	D	E	F
Annual Coverage Hours	Number of hours in a single shift	NAWH	SRF for 1 shift (A ÷ B)	Number of Shifts in 24 Hours	RF for 24hr coverage
2,920 hours (8 hours times 365 days)	8 hours	1,550 hours	1.88	3 shifts in 24 hours	5.65
	8	1,600	1.83		5.48
	8	1,650	1.77		5.31
	8	1,700	1.72		5.15
	8	1,750	1.67		5.01
4,380 hours (12 hours times 365 days)	12 hours	1,550 hours	2.83	2 shifts in 24 hours	5.65
	12	1,600	2.74		5.48
	12	1,650	2.65		5.31
	12	1,700	2.58		5.15
	12	1,750	2.50		5.01

Why would the RF for the two examples (column F) be the same? Does this mean that an 8-hour shift and a 12-hour shift have the same relief factor? Only if they have the same *Net Annual Work Hours*, which is usually not the case because employees who work 12-hour shifts usually work 84 hours in a 14-day pay period, while their 8-hour counterparts work only 80 hours.

The formula is simple, as shown in Figure 4.

Figure 4: Calculating Relief and Shift Relief Factors for 7 Day Posts

Type of Factor to Be Calculated	Formula
1 shift operated 7 days/week	$\frac{\text{Annual Coverage Hours}}{\div \text{Net Annual Work Hours}}$ $= \text{"Shift Relief Factor" (SRF) for 1 shift}$
24 hour coverage 7 days/week	$\frac{\text{SRF for 1 Shift}}{\text{times Number of Shifts in 24 hours}}$ $= \text{"Relief Factor" (RF) for 24 Hours}$

What if you are not covering 7 days per week? It is a little more complicated, but again, the NAWH figure is the key. You will need to calculate the annual scheduled hours, using the following formula:

$$\text{Number of Hours in Shift} \times \text{Number of Days/Week} \times 52.14 \text{ weeks} \\ = \text{Annual Coverage Hours}$$

For example, a relieved post that operates 8 hours per day, 5 days per week, would require 2,086 annual coverage hours:

$$8 \text{ hours} \times 5 \text{ days} \times 52.14 \text{ weeks} = 2,086 \text{ annual coverage hours}$$

To calculate the shift relief factor:

$$\text{Annual Coverage Hours} \div \text{NAWH} = \text{Shift Relief Factor}$$

For example, the 8 hour shift operated 5 days per week in the preceding example, for a classification of employee that has a NAWH of 1,550, would have a Shift Relief Factor of 1.35:

$$2,086 \text{ annual coverage hours} \div 1,550 \text{ NAWH} = 1.35 \text{ SRF}$$

Still confusing, or just too much trouble? Go to www.staffinganalysis.com and download a simple Excel file that we have created. It provides several “fill in the blank” forms that will allow you to convert back and forth. As with all of the resources we describe in these articles, they are free.

Conclusion

Take a look at the NAWH methodology. It works, and it works better than previous tools. It is more accurate and more versatile and it improves the accuracy of budget requests.

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The materials identified in this article, along with many other resources, are available at no cost at our on-line staffing analysis clearinghouse: www.staffinganalysis.com.

The clearinghouse is a service provided by CRS, Incorporated, a non-profit organization (www.correction.org).

Rod Miller has headed CRS Inc. since he founded the non-profit organization in 1972. He is the author and co-author of numerous texts and articles on various aspects of jail planning, design, and operations. For more information, contact him at rod@correction.org, 925 Johnson Drive, Gettysburg, PA 17325, and (717) 338-9100.

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From Budget to Deployment: Increasing Efficiency by Understanding the Mechanics and Math of Scheduling

By Rod Miller and John Wetzel

This is the eleventh article on jail staffing analysis, exploring the methodology developed by the National Institute of Corrections (NIC) and presenting enhancements developed since NIC's latest workbook¹ was published. In this article, we provide an overview of the mechanics associated with taking budgeted funds and deploying employees in the jail. We also provide new tools to sharpen scheduling efforts.

Professional jail employees are essential and expensive. Few jurisdictions have enough tax dollars to add jail employees without careful consideration and analysis, or to use costly employee hours for activities that are not essential.

Jail managers cannot afford to waste the staff hours that are funded, but without measuring the efficiency of scheduling practices, that is precisely what happens. Admittedly, measuring is difficult—unless deliberate efforts are made to capture the right information and data.

In this article we provide an overview of the mechanics and math that take budget dollars and eventually deploy employees in your jail. There are several distinct steps in this process, and just about every step has the potential to “lose” paid hours if we do not understand, measure and manage it.

Figure 1 describes eight steps that take budget dollars and eventually deploy employees in the jail.

Working with jails throughout the United States, we have identified common mistakes that are made at *each step* of the process. Some of these are described below.

1. Budget Is Approved- FUNDS PROVIDED FOR EMPLOYEE HOURS.

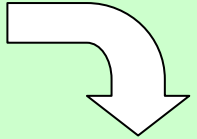
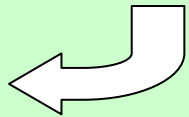
- Not enough funds requested (many potential causes)
- Too much money allocated for full-time employees leaving little for overtime/part-time hours

¹ **Staffing Analysis Workbook for Jails**, First Edition. Rod Miller and Dennis Liebert. National Institute of Corrections, Washington D.C. 1987. Second Edition published 2003. The NIC methodology has been embraced by jails throughout the United States and has also been adopted by police, fire, transportation, health care and nursing home operations.

2. Employees Are HIRED/RETAINED.

- Hiring too many full-time employees compared to hourly employee hours
- Not accounting for turnover
- Missing opportunities to increase employee retention

Figure 1: From Budget to Deployment-- The Major Steps

1	Budget Is Approved- FUNDS PROVIDED FOR EMPLOYEE HOURS. Funds are provided to pay for employee hours, as salaries and associated benefits, overtime hours, and part-time hours.	 <p>Some dollars used to purchase overtime hours and (in some agencies) part-time hours.</p>
2	Employees Are HIRED/RETAINED. Recruiting, screening and selection, training, and retention all contribute to the total cost of the hours that salaried employees work. Employee regular hours available for deployment are calculated using the Net Annual Work Hours (NAWH) figures.	
3	Employees Are ASSIGNED TO TEAMS (Squads/Groups) for the Purpose of Scheduling.	
4	Employees Are SCHEDULED TO WORK Regular Hours On Shifts. Regular Days Off (RDO) Are Determined.	
5	Some Employees SCHEDULE ABSENCES. Receive approval ahead of time for vacation, planned medical procedures, and other types of paid time off from work that may be anticipated and planned in advance.	
6	Some Employees Fail to Appear for Scheduled Shift Due to UNSCHEDULED ABSENCES. Employees call in sick, have family emergencies, and take other time off with pay without scheduling the time off in advance.	<p>Overtime and/or Part-Time Funds Are Used to Fill Deployment Vacancies</p> 
7	The Remaining Employees REPORT AS SCHEDULED for Work and Are DEPLOYED. Sometimes there are shortfalls, sometimes excesses.	
8	ADDITIONAL EMPLOYEES (part or full-time) ARE CALLED IN (As Needed) to Insure Minimum Staffing Needs Are Met.	

3. Employees Are ASSIGNED TO TEAMS (Squads/Groups) for the Purpose of Scheduling.

- Dividing total employee cadre into too many units, decreasing scheduling flexibility and efficiency
- Assigning too many employees to a squad compared to net coverage needs-creating frequent excess deployment
- Assigning too many new employees to the same team or squad
- Not managing vacancies to spread them out equally among all teams

4. Employees Are SCHEDULED TO WORK Regular Hours On Shifts. Regular Days Off (RDO) Are Determined.

- *Inefficient* scheduling (e.g. not using data to adjust for days of the week that employees are differentially absent, not distributing shifts evenly, not distributing shifts to correspond to varied needs by day of the week)
- *Unfair* scheduling (e.g. favoritism, too much deference to veteran employees) that results in low employee morale and higher turnover
- Too many persons involved with scheduling (causes inconsistencies)
- Person(s) involved with scheduling not properly trained for the task

5. Employees SCHEDULE ABSENCES.

- Ineffective policies that govern employee absence scheduling
- Unfair policies regarding scheduling of absences
- Lack of incentives (or penalties) for using less time off
- Unrealistic limits on the proportion of scheduled absences, making it impossible for some employees to schedule all hours to which they are contractually entitled
- Inaccurate recording and communication of scheduled time off

6. Employees Fail to Appear for Scheduled Shift Due to UNSCHEDULED ABSENCES.

- Lack of effective policies to reduce the frequency of unscheduled absences
- Lack of incentives (or penalties) for reducing unscheduled time off

7. Employees REPORT AS SCHEDULED for Work and Are DEPLOYED.

- Too many employees report and are not assigned to posts or details that are funded in the budget
- Too few employees report causing serious shortfalls

- In larger jails, or in jails that divide into many teams, excess employees on one team not “shared” to meet shortfalls on another team (and/or specialization inhibits the sharing of employees).

8. ADDITIONAL EMPLOYEES ARE CALLED IN (As Needed) to Ensure Minimum Staffing Needs Are Met.

- Too much overtime has already strained employees, causing morale and performance problems
- Unfair and/or inconsistent practices that offer overtime to employees
- Mandatory overtime causes morale and performance problems for some employees

In our ninth article (March-April 2007) we demonstrated that most schedules are not perfect. Schedules usually assign varying numbers of employees to shifts from day to day, even if the needed level of staffing is fixed.

When the number of employees who actually present themselves for a shift is below the level needed to ensure safety and security, various responses address the shortfall (bringing in employees on overtime, using part-time employees, holding employees over for another shift, reducing operations to adjust to the shortfall). But when *more* employees report, it is possible to waste costly staff hours.

Some jail managers assert that it is rarely possible to have too many employees on a shift because there are always extra duties that may be performed. In many instances, this may be true. But when an employee’s regular hours are expended for activities that are not funded in the budget (e.g. not identified in the coverage needs, or not anticipated in Net Annual Work Hours calculations), at the very least a budget problem is created.

Because the excess hours are not free, they are essentially wasted. They come out of your budget, but do not reduce the hours you need to operate your jail. At worst, funds will run out before the end of the budget year and staffing levels may be forced to drop below safe levels in order to reduce overtime.

How often do more employees report for duty than are needed in your jail? Probably more often than you think. More important, if you are not able to provide a quick and accurate answer, you are not measuring your losses.

Most jails are not armed with the tools to identify and analyze this situation. Rarely does a jail collect needed detailed information about actual deployment that allows for thorough analysis. We will identify new tools and techniques improve such data collection practices later in this series. For now, we assert that intermittent (and sometimes periodic) staff overages are common, but are rarely recognized. In some instances, we have found over 20% of employees hours are worked at times, and for activities, that were not included in the coverage plan or NAWH.

The most common symptom of this ailment is a shortfall of funds at the end of the budget year—employee regular hours do not go as far as they were expected to go. This provokes three types of responses:

1. Unexpected use and levels of overtime
2. Temporary curtailment of jail activities in order to stay within the budget (such as canceling visitation, canceling inmate dayroom time)
3. Failure to staff key posts

When these unwelcome budget surprises are identified, any of these responses produces serious management and operational problems.

If overtime is used to respond to shortfalls, employees will be working more hours and days, resulting in fatigue, diminished performance, and a disruption of their personal lives. This degrades employee performance and often erodes employee morale.

When the second response—curtailment—is used, the routine operation of the jail is interrupted. In many instances, this diminishes the extent to which the jail's mission is achieved during the curtailment. Sometimes the effects of curtailment are cumulative and impact operations in later days and weeks.

But when key posts are vacant, there may be immediate threats to the safety and security of the jail.

Most jails use a combination of these three responses. The proactive manager also learns from these unpleasant experiences and improves future management and budgeting practices.

It is common for a jail manager to simply add the amount of the current year's shortfall to the request for next year—easy but clearly imprecise. We suggest a more calculated approach that accurately identifies the hours that were not accounted for, and then explores whether there is another way to address the ebb and flow of the schedule without throwing more money at the problem.

Figure 2 in our ninth article² demonstrated how often a simple schedule produces varied levels of employees on the daily roster, sometimes exceeding the level of coverage that was determined to be necessary. We identified various responses that respond to the *insufficient* level of staffing, including:

- Asking employees to volunteer to work overtime, or instituting mandatory overtime to fill vacancies
- Calling on part-time personnel to fill vacancies

² *Measuring the Efficiency of Schedules*, Miller, Rod and John Wetzel. P. 63 *Sheriff*, March-April 2007. National Sheriffs Association, Alexandria, VA.

- Operating below minimum levels and altering operations to compensate for staffing shortfalls (e.g. which post[s] may be unfilled, what services or activities are to be suspended)

Employee *shortfalls* on a shift present operational problems which, if not addressed effectively may pose safety and security risks, and heighten agency liability exposure.

Employee *excesses* rarely pose such operational problems—after all, more hands and heads to implement the many jail tasks are always welcome. Rather, these excesses create budget and management problems.

There are many ways to respond to intermittent employee excesses. These include:

1. Sharing employee(s) with another team that has a shortfall
2. Assigning employee(s) to special details and activities that were anticipated in the budget, such as shakedowns or security inspections
3. Assigning employee(s) to activities that were anticipated in the Net Annual Work Hours (NAWH) calculations, such as training
4. Allowing employee(s) to leave early, using some of their earned time off

The first two responses apply the extra employee to activities that were part of the coverage plan. The latter two use employee hours that were budgeted as part of the NAWH calculations. In both situations, the activity was anticipated and funded in the budget. When employees work “outside the budget,” managers often find themselves in trouble at the end of the year.

A New Tool to Hone Your Scheduling Skills

The NAWH calculations that were created earlier in the process once again prove helpful. They may be used to refine the scheduling process. NAWH expresses the “net” hours that an average employee will actually be deployed every year. Using this as a starting point, it is possible to create a:

- “Scheduling discount” that calculates the net number of employees that may be expected to actually report for duty
- “Scheduling premium” that calculates how many employees would be needed on the schedule to net the number of employees sought for a shift

Figure 2 provides examples of scheduling discounts and premiums, and presents the simple formula that is used to create these factors.

Figure 2: Scheduling Discounts and Premiums

A	B	A ÷ B	B ÷ A	Example 1	Example 2
Annual Hours Employee is Scheduled	NAWH	Discount	Premium	# of employees who would report for work on a average day, out of 10 names on the schedule	# of employee names needed on the schedule to have 10 employees report for work on an average day
2086 40 hours per week times 52.14 weeks	1,550	0.74	1.35	7.43	13.46
	1,600	0.77	1.30	7.67	13.04
	1,650	0.79	1.26	7.91	12.64
	1,700	0.81	1.23	8.15	12.27
	1,750	0.84	1.19	8.39	11.92
2190 42 hours per week times 52.14 weeks	1,550	0.71	1.41	7.08	14.13
	1,600	0.73	1.37	7.31	13.69
	1,650	0.75	1.33	7.53	13.27
	1,700	0.78	1.29	7.76	12.88
	1,750	0.80	1.25	7.99	12.51

If you use a “relief factor” instead of NAWH, use the information in Figure 3 to make the necessary conversion.

Figure 3: Example of Net Annual Work Hours (NAWH) Compared to “Shift Relief Factor” (SRF) and “Relief Factor” (RF)

A	B	C	D	E	F
Annual Coverage Hours	Number of hours in a single shift	NAWH	SRF for 1 shift (A ÷ B)	Number of Shifts in 24 Hours	RF for 24hr coverage
2,920 hours (8 hours times 365 days)	8 hours	1,550 hours	1.88	3 shifts in 24 hours	5.65
	8	1,600	1.83		5.48
	8	1,650	1.77		5.31
	8	1,700	1.72		5.15
	8	1,750	1.67		5.01
4,380 hours (12 hours times 365 days)	12 hours	1,550 hours	2.83	2 shifts in 24 hours	5.65
	12	1,600	2.74		5.48
	12	1,650	2.65		5.31
	12	1,700	2.58		5.15
	12	1,750	2.50		5.01

Of course, not all days of the week, and not all months of the year, experience the “average” number of employee scheduled and unscheduled absences. Therefore it is

necessary to collect and analyze data about your employees and their habits in order to further refine your scheduling efforts.

More tools and techniques will be provided in the next article, continuing our effort to expand resources for staffing analysis.

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